Proposed Institute Creation for the Canadian Institutes of Health Research

A Working Paper of the Institute Creation Sub-Committee presented to the Interim Governing Council of the Canadian Institutes of Health Research

Each of the Sub-committees of the Interim Governing Council has developed a Working Paper, which outlines the conclusions of its members on a specific area of focus. These Working Papers are available to the wider health research community via the CIHR web-site in order to share the latest thinking, directions and issues as currently formulated through the Sub-committee process. The Working Papers do not provide final decisions but rather represent the advice of the Sub-committees.

This is the working paper on Institute Creation
June 2000

Sub-Committee on Institute Creation

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The following Working Paper outlines the recommendations of the Subcommittee on Institute Creation of the Interim Governing Council of the Canadian Institutes of Health Research. These recommendations are based on extensive discussions between IGC members, and incorporate insights from submissions on Institute creation that were received from the public. Please note that what follows are recommendations only and that the CIHR Governing Council will make actual decisions on Institute design and structure.

In the interest of clarity, the subcommittee presents the recommendations in the form of a summary, without always indicating the lines of reasoning, or sources, that were used to arrive at the recommendations. Moreover, this summary is focussed on the functioning of Health Research Institutes in relation to the various operational elements of CIHR and does reiterate the outcomes of the deliberations of the other subcommittees to any significant degree.

1. INTRODUCTION

The selection of a slate of Institutes is a key part of a series of decisions the Governing Council of the Canadian Institutes of Health Research (CIHR) must make in the months ahead. As important as the formative designation of Institutes is, however, the design of other CIHR structures – programs, peer review, offices, consortia, standing committees, and partnerships – will also have a major role in realizing the vision and objectives of CIHR. All decisions regarding CIHR will need to take into account the overall capacity of its interactive systems, including Institutes, to support and encourage excellent research, to be strategic, inclusive, and evolutionary, adapting continuously to advances in research and the changing needs of Canadians and the health system.

The following working paper, by the CIHR Interim Governing Council (IGC) Sub-committee on Institute Creation, provides advice on creating an initial slate of Institutes to meet the objectives of CIHR. The advice provided in this paper is based on extensive consultations and Sub-committee evaluation of the input from the research community and stakeholders. The paper outlines the process the Sub-committee has taken, the establishment of the initial parameters and criteria for Institutes and slates of Institutes, the public consultation process on slates, the evaluation of that consultation, a proposed list of initial Institutes (within an adaptive model), some key considerations around the interplay between Institutes and the CIHR corporate functions, as well as time lines for putting Institutes in place.

2. *DELIBERATIONS ON INSTITUTES*

This working paper on Institute Creation follows the recommendations on Institutes contained in the working paper on Institute Design. In that paper, Institutes are presented as the key to making CIHR one of the most innovative health research organizations in the world. Institutes are the value-added element that propels the CIHR decisively beyond the organizational limits of a traditional granting council. They provide the thematic and strategic focal points for health research activity that will accelerate discovery, broaden our horizons and understanding of health, promote the creation of new knowledge and discoveries, forge new partnerships and align research with the health interests and needs of Canadians. Institutes will function as virtual networks that cross the boundaries of discipline and geography. They will enhance Canada's ability to attract and retain the very best talent in health research. They will be flexible and varied instruments to meet the diverse health needs of Canadians.

2.1 *The Criteria and Parameters for Establishing Institutes*

Building on the recommendations in the Institute Design working paper, the Sub-committee on Institute Creation arrived at criteria that any given Institute must satisfy, as well as basic parameters to which any given slate of Institutes must conform. Taken together, the criteria and parameters provide the framework the IGC has developed to guide it in proposing an initial slate of Institutes.

The criteria for assessing individual Institutes were developed after extensive IGC discussions on the objective of CIHR, an evaluation of the criteria of international research organizations (especially the US National Institutes of Health, (NIH)), and after a review of the submissions proposing individual Institutes received by the CIHR Secretariat. The specific criteria against which each Institute should be assessed are:

- Relevance to the health of Canadians - including resonance with the Canadian public;
- Balance of foci - on health (well being, promotion and prevention) and disease (understanding, cure and care);
- Inclusivity and integration of all relevant perspectives in health, including bio-medical research, clinical research, research respecting health systems, health services, the health of populations, societal and cultural dimensions of health and environmental influences on health;
- Excellence of Canadian research - as measured on international standards, and the potential for Canadian leadership;
- Capacity and opportunity - potential to develop a cadre of excellent researchers to anticipate and respond to emerging issues in health; and

- Partnerships - potential for and commitment to partnerships with relevant stakeholders in health, including a variety of communities and organizations in the public and private sectors.

In addition to these criteria, the legislative framework outlines that Institutes collectively aim to:

- Create a robust environment for research and research training;
- Incorporate the full landscape of health research that contributes to the understanding and resolution of important health issues;
- Build on existing areas of strength and create opportunities for the emergence of new areas of research and inquiry in health (including leadership dimensions);
- Anchor and reinforce the new patterns of research and partnership required to contribute to complex health challenges. Of particular importance are interconnections among Institutes that foster integrated, collaborative and multi-disciplinary approaches to complex health challenges;
- Provide opportunities for the networking of researchers among disciplines, institutions, regions and health specialties; and
- Be evolutionary, not static. There will also be program structures that will build linkages between Institutes and support cross-cutting activities.

This working paper endorses the statements in the 1999 federal budget indicating that CIHR would have 10 to 15 Institutes of significant scale and scope. The CIHR investment in health research is forecast to rise to close to $530 million by 2001-02. That investment is some 25 percent of the total investment in health research across Canada. At present, approximately 3000 researchers at all stages of their career are supported by the Medical Research Council, with a community of approximately 9000 researchers involved in applications for funding. There are also likely some 3000 - 4000 researchers who will be embraced by an expanded health mandate, and new health partners. The CIHR constituency of potential applicants is therefore significant and underlies the sustainability of the Institutes as they open up new opportunities for Canadian health researchers. Given these assessments, it is reasonable to expect that each Institute will support a research program in the order of $20 to $80 million, and will include between 200 and 500 researchers.

2.2 *Consulting the Community*

These criteria and parameters for evaluating Institutes and Institute slates framed the public consultation process that invited input from the health research community. While stressing the importance of the input received in this external consultation, the Sub-committee assumes the responsibility for evaluating this input and the advice offered on the shape of an initial slate of Institutes.

The consultative process targeted organizations with an interest in health research, such as universities, teaching hospitals, voluntary health organizations and government departments. At the same time, the

public was given an opportunity to give advice on slates through the CIHR Web site. Potential respondents were advised that particular attention would be given to the substantive rationale provided for the approach to Institute creation, the overall dynamism and coherence of an Institute slate and the alignment with the presented criteria.

The "Request for Input" asked respondents to present their slates along with responses to a number of specific questions designed to inform the IGC's thinking about the criteria and rationale for creating a slate. This included the formulation of the criteria, proposed scale and scope of Institutes, as well as the disciplines, fields and sectors of inquiry to be incorporated within each Institute, and any priority thrusts. Input was solicited on special roles for Institutes in promoting cross-cutting activities/issues among Institutes (above and beyond their internal Institute focus). As well, respondents were asked: how the architecture for the Institute slate contributes to health outcomes and addresses Canadian interests; how effectively the slate incorporates all health researchers; what areas of research or inquiry are not (or may not be) adequately incorporated in the proposed slate; what was the process whereby the slate was developed; what corporate functions of CIHR, if any, are required to complement this slate of Institutes; and how a proposed Institute slate could evolve over time, especially in regard to emerging issues and underdeveloped areas of research.

3. *THE COMMUNITY'S RESPONSE TO THE REQUEST FOR INPUT*

The health research community's response to the "Request for Input" was extraordinary in number, in the extent of its reach, and in the richness of thought and creativity dedicated to this exercise. This exercise built on the efforts put into the over 150 unsolicited proposals for individual Institutes received earlier in 1999. Over 80 substantive submissions on Institute slates were received from universities, research hospitals, voluntary health organizations, every level of government, granting councils, health research partners of all sorts, ad hoc groups of researchers and from a number of individual Canadians. In almost every case, the submissions were themselves the product of extensive debate, consultation, collaboration and consensus. What the submissions reveal collectively, is the extraordinary penetration of the consultation process into almost every area of the health research community in Canada, and across disciplines, sectors of research, diverse research partners and geography. The submissions demonstrate the national and comprehensive scope of the consultation process.

What the submissions also reveal is stimulated by how "transformative" the consultation process has been. The development of the submissions has fostered the creation of networks – one of the essential building blocks of CIHR Institutes – among diverse research partners, as respondents came together to collaborate on the development and construction of the slates. For instance, one submission was the result of consultation across ten different university faculties, with more than seventy active participants, and involving representation from regional health authorities and the provincial government. Another submission came from an ad hoc interdisciplinary health research group comprising individuals from different disciplines, fields of enquiry and regions of Canada. The group convened a full meeting of

researchers and policy makers/analysts from universities, government, the non-government and voluntary sectors. These and many other similar submissions demonstrate the enthusiasm of the diverse health research community to come together under the CIHR umbrella to transform health research in Canada. The submissions were clearly developed in the spirit of CIHR. The submissions revealed extensive networking among many groups that had not, in the past, worked together on health issues, which is in itself a significant step to realizing the CIHR objective.

3.1 General Considerations

While respondents diverged considerably in their response to the parameters and questions raised in the public consultation, they seemed to accept the criteria as stated. Many noted those criteria for Institute Creation that were most relevant and/or important in their slate development process. A few expressed their views on the particular importance to the CIHR vision of one or two of the given criteria for the slate.

Some responded, item by item, to the questions posed and provided a rationale for the slate proposed. Others chose to address only a few of the questions or to propose a slate of Institutes without providing a background rationale. No respondents rejected any of the suggested parameters.

A number of the submissions, especially those from larger universities and established associations, suggested an initial slate of eight to ten Institutes, making reference to the need to restrict administrative costs. Many commented on the need for future flexibility, and of leaving room to create new Institutes in the future. The importance of evolution in Institute structure was a common theme. Some discussed the importance of starting with a small number of large Institutes, to encourage integration and collaboration. For many, an underlying concern was how key areas of research could advance without a designated Institute home. Of particular concern was whether CIHR would have the capacity to promote development of the underlying knowledge base through long-range research in such areas as genetics, population health, health systems and services and specific clinical disciplines unless there were designated Institutes in these areas.

Respondents to the call for input largely accepted the fact that the demand for designated Institute themes exceeds the realistic initial target of 10-15 Institutes. Inclusion of some of the sub-themes as a component of the names of larger Institutes was suggested as one means of increasing the comfort level with the ultimate constitution of CIHR. Some research groups clearly feel threatened by the concept of being subsumed within larger Institutes.

3.2 The Various Approaches to Institute Designation

Most respondents proposed Institute slates that were based on a hybrid framework – a pragmatic approach based on more than one conceptual framework for Institute themes – e.g. diseases, physiology, special need population groups, health issues, and scientific disciplines. For example, one submission states:

> *"Our slate combines Institutes that are disease-based, organ-based, and discipline-based to obtain the balance and complementarity needed to cover all aspects of health research. The choices are based on the existing strengths within the Canadian research community as well as obvious burdens on the health care system."*

Another group identified three basic approaches and proposed the establishment of a "core" set of Institutes within each of the following three categories:

- the disease and body systems approach;
- the life stages approach; and
- the population health approach.

Similarly, another interdisciplinary group of researchers identified a slate with Institutes based on each of several organizing principles:

- Diseases and organs;
- Basic science disciplines;
- Major themes identified in the CIHR Act (health services, population health, human development and society); and
- Emerging and important areas of health research; drugs, devices and health technologies.

Some submissions commented on the importance of the opportunity afforded by the creation of a slate of Institutes to incorporate significant issues that have been marginalized by current health research funding configurations. Their incorporation into an integrated research agenda would give them a place that corresponds with their importance to health, rather than to the amount of effort/dollars that have been spent on research in these areas in the past.

3.3 Key Points of Consensus

Among the diverse views communicated in the consultation, there were many important and significant areas of convergence:

- Consensus around current, emerging and overarching health research priorities of Canadians as

represented in the many common Institute themes found in most submissions (despite the variety in presentation);

- Recognition of the importance of integrating the various health research disciplines within and among Institutes;
- Consensus on importance of maintaining fundamental research excellence and recognizing the essential role of basic sciences within all Institutes;
- Recognition that there will be diversity among Institutes in developing capacity (particularly important for emerging areas) and supporting existing strengths;
- Consensus that Institutes should be highly adaptive to changes in research advances and health priorities;
- Support for maintaining flexibility in the structure and operation of Institutes to ensure field and researcher affiliation across the spectrum (a "home" for everyone);
- Commitment to mechanisms to address major health issues. e.g., women's health, health of rural and remote populations, immigrant and ethnic communities and aboriginal communities.
- Recognition of the need to develop research partnerships between CIHR Institutes and other organizations active in support of health research in the public, private and voluntary sectors;
- Consensus that there must be the means to establish interactions among Institutes.
- The value of using other mechanisms, such as peer review, programming and the specification of the mandates of Institutes, to address some of the particular issues raised; and
- Consensus that Institutes must be flexible and responsive, requiring a robust evaluation mechanism to ensure continual and effective evolution of Institutes.

These significant areas of convergence emerging from the wide-ranging discussions within the research and stakeholder communities served as the point of departure for the IGC discussions on the initial slate of Institutes.

4. THE STARTING SLATE OF INSTITUTES

4.1 Key Considerations

A number of key considerations guided the work of the Sub-committee. A key consideration was the legislative framework, expressed in the CIHR Act. It stipulates that CIHR is a research organization ultimately devoted to the outcome of improving the health of Canadians, creating more effective health services and products and a strengthened Canadian health care system. In addition, the CIHR Act sets out the instruments for achieving these outcomes, specifying the requirement to include the four themes under each Institute and the need to be inclusive and integrative of health research communities and health research partners in other sectors. In effect, the CIHR Act says that the best way to have a positive impact on the health of Canadians and to improve health outcomes is by encouraging research functions and structures that promote an effective balance between prevention and cure, and health and disease.

The 1999 federal budget indicated certain parameters for the discussion. It stated that CIHR would have 10 to 15 Institutes of significant scale and scope, and set out financial support accordingly.

The Sub-committee also gave a lot of weight to the response of the health research community, the stakeholders and the general public to the request for input. The majority of slates submitted demonstrated that there is a significant amount of commitment to the integration and inclusivity that is possible and desirable in the organization of the Institutes.

The Sub-committee considered the starting number of Institutes. Some submissions from the larger universities and associations favoured starting with 8 to 10 Institutes, largely to keep the administrative costs down. Others recommended starting with even fewer 'umbrella' Institutes in order to allow for future flexibility and room to create new Institutes. The importance of evolution in Institute structure, bottom up 'organic' growth, and maturation process was underlined by individuals favouring a smaller starting number of Institutes.

The Sub-committee factored in all these issues in its discussions on the starting number of Institutes and concluded that the starting slate of Institutes needed to reflect, above everything else, the research, and health priorities identified by the researchers and health partners. These priorities included a comprehensive coverage of research strengths in key areas of concern to Canadians, such as cancer, mental health, social determinants of health, cardiovascular and respiratory health and the health care system. They also included a commitment to emerging and strategic areas of research, such as genetics and Aboriginal health. The Sub-committee did underline, however, that Institutes must have the capacity to develop and evolve over time and to work out collaborative arrangements among themselves. This ongoing flexibility will have an impact on the longer-term scale and number of Institutes and will likely be as important as the composition and the number of the starting slate.

Issues related to the criteria for Institutes, such as capacity and critical mass, the viability of Institutes, incorporation of emerging and overarching health concerns, and issues around public recognition and support for the Institutes were all considered by the Sub-committee. These included the need to encourage innovation and change, and how best to support research in important areas of women's health, ethics, and rural health, without the entrenchment of silos of research. In the area of Aboriginal and Indigenous health it was recognized that this was an area of overarching importance to the research and stakeholder communities. Notably, numerous slate submissions identified aboriginal health, and women's health as priority areas of research. The Sub-committee also underlined the potential for Canadian researchers to lead and establish international linkages and collaboration in the area of aboriginal health .

4.2 Proposing a List of Institutes

Given the above context, it was not possible to create an Institute for every health problem in Canada. Figure 1 provides a configuration for the starting slate of Institutes that has embedded within it a selection of approaches to the grouping of some related and/or complementary research areas. Where these involved substantial research communities such as in Genetics, Population Health, Human Development and Life Cycle, we have suggested alternative groupings and organization of research that involve coherence within the Institute without sacrificing the benefits of cross-disciplinary approaches. Appendix I contains draft Institute descriptions intended only to illustrate the potential breadth and reach of the Institutes and to illustrate how the four CIHR Themes could be represented in the Institutes.

Institutes will not be expected to have identical structures although they must conform to the overall guidelines. Among institutes, there is the potential for diversity in structure, in approach, in the ratios of investigator initiated and strategic research, and in initial capacity across all areas of research. An adaptive model for clustering research areas is more likely to allow for knowledge development and to enable the next generation of Institutes to be realized in a timely way. Given the scale of some proposed Institutes, there may also be a need for co-leadership within those Institutes, especially if they incorporate research communities at very different stages of development or distinct research cultures that may require time to build complementary research agendas.

An important decision had to be made about what to do with areas that might have been set aside in an individual institute, or that could be made an important aspect of all institutes. One such area is ethics. The legislative framework expressed in CIHR Act sets out a legal obligation to include ethics as part of the overall operation of CIHR. This requirement is reflected in the Sub-committee decision to make ethics part of the mandate of all of the Institutes, and in addition, to give a special responsibility in this area to the Governing Council of CIHR.

4.3 Particular Areas of Sub-Committee Discussion

Considerable debate centred around the proposal to establish an Aboriginal and Indigenous People's Health Institute (AIPHI). There was full agreement that a significant and disproportionate burden of illness borne by the Aboriginal population in Canada demands attention. Health Canada and the Prime Minister have also identified the health of Aboriginal people to be a high priority. As well, in the process of the approval of Bill C-13, to establish the CIHR, both the House of Commons Standing Committee on Health and the Standing Senate Committee on Social Affairs, Science and Technology recommended that the Governing Council of the CIHR take into account the significant interest of Canadians in Aboriginal health issues when establishing the Institutes.

The consensus reached by the Sub-committee was to recommend the establishment of an Aboriginal and Indigenous People's Health Institute, in which capacity building would be an important part of its mandate. The potential exists for a wide variety of partnerships between the AIPHI and other Institutes, and with national and international organizations. In particular, the Sub-committee recognized that there is a tremendous opportunity for a special partnership between an Aboriginal health research Institute and the Organization for the Advancement of Aboriginal Peoples, and with Health Canada. The advantage these partnerships would present in pursuing research questions and promoting the dissemination and uptake of research results will be significant.

The Sub-committee also believes that there is great potential for the Aboriginal Health Research Institute to deliver significant benefits in a number of areas including, research in major areas of morbidity and mortality, culturally relevant research and research that can evaluate and determine which health interventions and investments are most effective. Partnerships on strategic initiatives and other research programs could be developed by CIHR, the Organization for the Advancement of Aboriginal Peoples' Health and Health Canada in priority areas such as diabetes, and child health, and development. These initiatives could be developed in collaboration with the proposed Institute on Nutrition, Hormones and Metabolic Health and the proposed Institute on Human Development and Child Health. Through CIHR Institutes, Health Canada would gain access to the work of thousands of health researchers across the country funded by CIHR. In turn, Health Canada could provide access to necessary information on health services for research purposes and could promote the dissemination and uptake of research results.

The federal government has a fiduciary responsibility for First Nation and Inuit, and Health Canada has a specific responsibility for the delivery of non-insured health services to these groups. A strong partnership, therefore, between CIHR and Health Canada is warranted. Discussion of such a partnership, including the nature and scale of contributions of each partner, should be an early goal for CIHR and the Aboriginal and Indigenous Health Research Institute.

Such a partnership would be an early triumph for CIHR, and would highlight future opportunities for cooperation and partnership to achieve common goals. The AIPHI is an example of how the CIHR can

embrace diversity amongst its Institutes and also of its capacity to respond directly to a significant Canadian health issue. In all other essential characteristics such as basic governance appointments and structures, peer review, standards of excellence and accountability, the Institute would be the equal of its fellow Institutes.

Another issue of profound importance is women's health research. It is now widely recognized that past lack of attention to gender and sex analyses in addressing health research questions has resulted in significant knowledge gaps that hinder our capacity to understand important health issues. Several submissions, responding to the request for input on slates of Institutes, noted the important strides that have been made in the area of women's health research toward a truly integrated and comprehensive approach that could serve as a model for all CIHR Institutes. Some submissions proposed a CIHR Institute focussed on women's health as part of a comprehensive slate, in part based on the rationale that women's health research could stand as a forward-thinking model of integrative research toward which all CIHR Institutes should be evolving. The Sub-committee's position is that women's health is so integral to all aspects of health research that at a minimum it must be embedded fully and equally within all of CIHR's Institutes and that each Institute should be held accountable in facilitating gender-sensitive and women-sensitive research, with particular attention to capacity building and knowledge generation as it pertains to women's health. Additionally, the Governing Council should exercise particular stewardship with respect to this component of CIHR's activities and support a strong Office of Women's Health that is empowered to partner with Institutes and forge partnerships with external stakeholders.

Canadians living in rural areas – about a third of Canada's population – form another population of particular importance for health research. Rural communities face a number of challenges that have profound implications for the health and well-being of their populations. These challenges include: the environmental degradation and high occupational risks associated with many rural-based economic activities; social and demographic challenges associated with isolation, out-migration of the young, and high unemployment rates; and the challenges of delivering health services in rural areas. In spite of a growing body of Canadian researchers devoted to rural health issues, the need for research capacity building in this interdisciplinary area of health research is critical. CIHR has a unique opportunity to take a leadership role to ensure the ongoing development of rural health research in Canada. This could include building a critical mass of researchers identified with rural health research, as well as developing innovative research networks and partnerships devoted to rural health.

An area of fast emerging research interest is alternative and complementary therapies, as well as traditional practices. A wide range of therapies and practices designed to restore or maintain health are available as alternatives or complements to conventional medical practice and are being actively sought by Canadians. Many of these interventions are not delivered in clinical settings, and are used as preventive measures. Relatively little research evidence exists to help consumers and health practitioners make decisions regarding these alternative and complementary practices and products, and to help governments make good regulatory and funding decisions. The proposed slate of Institutes

gives the primary responsibility for research on alternative and complementary therapies to the Institute on Health Systems: Care, Healing and Recovery. However, this is also a cross-cutting area and aspects of it would be of interest across virtually every Institute.

4.4 Cross-cutting, Integrative Mechanisms

Researchers and policy leaders have also voiced concerns that distributing disciplines or research interests across the CIHR Institutes may preclude development of capacity and important intra-field synergies. Similar concerns have been expressed with respect to the four cross-cutting health research themes. There is a fear that a theme without a natural home in a specific Institute will not have an ongoing critical mass of researchers and resources to ensure that this dimension of research will be an integral part of Canadian health research over the long run. The concerns that a specific slate of Institutes may not initially accommodate all priority areas are real and legitimate and must be addressed in adopting any specific slates of Institutes. In this context, the Governing Council will have particular responsibility to promote innovation in setting up structural vehicles to respond to issues and areas that extend across most or all Institutes as well as to perform important functions that promote the CIHR objectives. In this regard, we can draw on the NIH experience, in the United States, in establishing Offices whose role is to address and promote priority areas and issues of strategic concern to the Governing Council and the Canadian public.

An office in the CIHR setting could serve at least two key functions. The first could be to promote cross-cutting research policies and activities in such areas as ethics and the integration of the four key sectors of research as mandated by CIHR legislation. A second key function for an Office could be to develop emerging areas of research where particular focus, profile and monitoring for results is necessary, but where it is desirable to streamline research activities across the disciplinary range represented in the Institutes. Thus, the Sub-committee's support for a robust Office of Women's Health is an example of how the CIHR could employ an Office as a vehicle complementary to the Institutes. The NIH experience also illustrates how an Office can incorporate some features of Institute structures such as, the appointment of a Director and Advisory Board and a research budget to address areas of need and strategic objectives. An Office could evolve into an Institute over time or fulfil its mandate and terminate. Evaluation and sun-setting requirements would apply to an Office in the same way as they would apply to an Institutes. The IGC Working Paper on Institute Design (November, 1999), and the Report of the IGC to the Minister of Health, provide more detailed discussions on potential CIHR structures, such as offices and standing committees.

There are other important integrative mechanisms within CIHR, but outside the specific Institute structure, which are designed to complement and enhance their function. Moreover, there will be many mechanisms by which a wide range of areas in health research can flourish in CIHR within a set of broad institute headings. One of the most important of these is the CIHR peer review process. Peer review will be situated outside the Institute context. This will ensure comprehensive field, disciplinary and interdisciplinary coverage and will conduct reviews with an expanded range of expertise to enable

the full participation of the broad health research community in research activities of the Institutes. In this way, excellent proposals in areas of research that do not correspond to the focus of any specific Institute will not be disadvantaged.

Another effective mechanism is program design. The CIHR transition programs, which have been collaboratively developed with the participation of all the federal health research granting and funding bodies for facilitating the transition to CIHR, are good examples of programming mechanisms that actively promote all areas of research. The Interdisciplinary Health Research Teams (IHRTs) and Community Alliances for Health Research (CAHRs), in particular, will be important to the building and enhancing of research groups. While Institutes will be a focal point for scientific leadership and research integration, programs and peer review will remain essential and visible structures in the overall CIHR framework. Thus, a comprehensive peer review process, together with expanded programming opportunities, Offices, Standing Committees, and strategic initiatives, will ensure that all disciplines and areas of research will be accommodated and encouraged within CIHR.

Figure 1: Initial Institutes Proposed for Consideration by Governing Council of CIHR

Cell Function and Cancer
Aboriginal and Indigenous People's Health
Cardiovascular and Respiratory
Health Systems: Care, Healing and Recovery
Musculoskeletal Health and Fitness
Immunity and Infection
Nutrition, Hormones and Metabolic Health
Health Throughout the Lifecycle
Human Development and Child Health
Mental Health, Addiction and Brain
Social, Environmental and Genetic Influences on Health
Genetics and Health
Healthy Aging Through the Lifecourse
Population Health, Social and Environmental Determinants
Standing/Advisory Committees**
Peer Review Committees
CIHR
Offices*

* eg. Ethics Office, Office of Women's Health.

** eg. Executive Committee, Standing Comittee(s) on the key sectors of health research.

4.5 CIHR - Wide Issues

No formulation of the CIHR Institute slate will ensure attention to the full range and scope of important issues in health and in research that CIHR is envisioned to offer. Depending on the ultimate structure of the slate of Institutes, and the related offices, programs and standing committees, a number of issues will likely remain a special responsibility of the Governing Council as being of overarching importance. The Sub-committee on Institute Creation suggests that the following issues might fall within the particular purview of the Governing Council's activities in order to ensure that the Institute structure is fully effective. The Governing Council would have at its disposal a full range of programs, policies and incentives to deliver on this mandate, including designated Offices, the Council-led Strategic Initiatives Fund and monitoring capacity.

Key stewardship issues are:

Gender and women's health – facilitating the incorporation of sex and gender across the full spectrum of CIHR activities (Institutes, programs, peer review structures) and enhancing women's health research capacity. The Governing Council is particularly well placed to foster both a focus on gender and a focus on women's health that informs and influences all aspects of the CIHR structure and activities. The Sub-committee is of the opinion that a strong Office would provide the most effective means of fostering women's health and gender analysis in health research and monitoring the overall effectiveness in all Institutes of CIHR.

Thinking beyond 2020 – fostering the next generation of ideas and researchers.

> *"...I heard Harvey say that after his book came out, he fell mightily in his practice. 'Twas believed by the vulgar that he was crack-brained, and all the physicians were against him. I knew several doctors in London that would not have given threepence for one of his medicines."*
>
> John Aubrey, a contemporary of William Harvey, commenting on the reception of Harvey's publication of "De Motu Cordis" in which he described his discovery of the blood's circulation, in 1628.

Some of the greatest discoveries in science have been made, and will be made, by mavericks and unconventional researchers. CIHR must find the means to support such research. While Institutes will be expected to support cutting-edge, innovative research in every sector of inquiry, it is critical that CIHR allow the "unthinkable" to be asked, even in the face of scientific and public scepticism.

CIHR will use a peer review mechanism to review cutting-edge, innovative research. But the peer review system in itself may not be adequate to support and identify risk-taking, unconventional research that is by definition without peers. The Sub-committee suggests that the Governing Council place risk-

taking and unconventional research in a special category and assume special responsibility for its promotion and funding. This may require innovative adaptations to the peer review process.

Embryonic and emerging concepts for Institutes – nurturing the concepts that might become CIHR Institutes or significant domains of research in the future. Special attention may be required for CIHR to incorporate an evolving array of fields of research that are not yet sufficiently mature for Institute status and that are sufficiently integrative that they do not fit neatly within the units of the peer review structure. An example of such an area is rural and Northern health that deals with issues affecting between one-fifth and one-third of all Canadians.

The Ethics of Research – ensuring a strong focus in all Institutes on ethics. A consistent application of core values, guiding principles and ethics goals appropriate to the evolving context of health research will be required. Thus, the Institutes will draw on the existing Tri-Council statements on research integrity and guidelines on human subjects, while continuing a proactive development and implementation of norms and policies to ensure high ethics standards. Furthermore, CIHR Institutes and Offices will need to promote and ensure broad ethics objectives by supporting interdisciplinary ethics research to serve important and changing health research needs. This will include attention to on-going evolution of these policy frameworks to deal with complex issues that arise at the intersect of research and the public interest, e.g. issues of informed choice in regard to new technologies and treatments, appropriate integration of biomedical and genetic technologies into the health care system, consistent with the ethical norms and values of Canadians. Ethics research helps to nurture effective ethics norms because ethics theory and reflection often define new standards and practices. The CIHR Institutes will also have a unique new opportunity to have an important ethics leadership role at the institutional, national and international levels.

The International Aspects of Health Research – promoting a strong focus in relationships, collaboration, and networks of researchers across international boundaries. Canadian researchers' participation in collaborative, international knowledge creation and uptake, is essential to Canada's capacity to participate at the leading edge of health research around the world, and also to maximize its capacity to receive, interpret and apply new research findings and thinking. The health aspects of Canada's aid to developing countries and the consequences of the globalization of disease are but two areas for shared investigation. International links would include the World Health Organization, other international bodies, as well as health research councils and government departments in countries with a major commitment to health research or with substantive research focus on areas of shared interest such as the health of Indigenous peoples.

Linking research with the interests of Canadians – ensuring a continuing focus on integrating the outcomes of research activities from all Institutes into considerations of how the health care system evolves to meet the health needs of Canadians. Institutes will provide research information that will enhance outcomes, and provide research evidence, data and information that will assist decision makers and health providers in making informal decisions. The CIHR Institutes can play a significant role in

increasing the profile and visibility of health research in Canada. This will, in turn, facilitate users' participation and public benefit and recognition. The Institutes will also play an important role in more effective communication of health research to promote the value of health research and understanding to diverse user audiences, including the general public.

4.6 *Interface with other research bodies*

The CIHR Institutes will come into being into a context that includes a wide range of organizations, research stakeholders and research-related initiatives. Because CIHR is to be integrative and transformative of health research in Canada, it is important that each Institute be developed and set up in a way that takes account of relevant external entities and the relationships that will develop between the CIHR Institute and these external organizations/initiatives. Each Institute will have its unique and specific situation and, with a specific slate of Institutes designated, CIHR will need to put into place developmental processes that will allow each Institute to evolve in a way that appropriately reflects its unique environment and purpose.

As the development of CIHR unfolds, CIHR will need to develop frameworks of policies and structures within which the individual Institutes will be able to carry out their individual development and day-to-day operations. While there must be an overall coherence and framework for the CIHR, it is also important that this framework allow the flexibility that will be required for each CIHR Institute to be able to respond to its particular environment and mandate.

In the early days of CIHR, priority should be placed on mapping out the important entities in each Institute's external environment and on establishing a CIHR framework for the development of joint strategic planning, partnerships in funding or peer review, and cross-representation with key external bodies. Key objectives would be to build synergies, avoid duplication or displacement of research funding activities of other organizations, and build the partnerships that will be critical to the realization of the CIHR vision.

5. PUTTING INSTITUTES IN PLACE

The first piece of business for CIHR will be to finalize the slate of Institutes. With intensive early work, the Governing Council may be able to announce the slate of Institutes within a few weeks of the launch of CIHR. The work of IGC during the last year, and the extensive submissions from the community, should inform that process.

The second key activity will be to recruit Scientific Directors and build Institute Advisory Boards (IABs). The Governing Council, once established, will need to quickly develop an outline of CIHR's first year corporate priorities, structures and planning processes. These decisions will provide the framework for defining the roles and goals of Institutes and Scientific Directors. The Governing Council could build on the nomination activities and experience of the IGC to develop a recruitment process and to exploit information already developed. Once in place, the SDs would play a significant role in the selection of start-up membership of the IABs. Building on the IGC data and experiences, the Call for Nominations for Scientific Directors and IABs could be made as soon as the slate of Institutes is announced. Most of the Scientific Directors could be in place within two months and the IABs in one additional month.

The planning cycle function of Year One of CIHR will in fact be compressed into about six months, from approximately September 2000 to March 2001. The Planning, Reporting and Accountability Structure (PRAS), required by Parliament through the Treasury Board), as well as the corporate strategy and overall budget of CIHR, will not likely be confirmed before Fall 2000. Given these start-up realities, interim processes and workplans are suggested to help Institutes through this six month planning period in Year One. With interim plans in place, CIHR will be prepared, at both the Governing Council and Institute level, to develop robust full-cycle strategic plans for Year Two.

In planning for the early activities of Institutes, Scientific Directors will benefit from the wealth of strategic analysis and material developed through IGC consultations and submissions, CIHR Opportunities and Institute Design Workshops and guidance from the Governing Council on start-up priorities. Building on this foundation and working closely with IAB members, Scientific Directors could develop simplified "Start-up Strategic Plans" in the Fall of 2000. These "Start-up Strategic Plans" would identify priorities for Institute building activities, including approaches for involving the full range of relevant players in a strategic planning process which could yield a full Institute strategic plan by late summer of 2001.

Appendix A: The Institute Descriptions

The Institute descriptions contained in this Appendix are intended only to sketch out the potential reach and breadth of Institute research areas. The draft descriptions illustrate how the four themes will need to be visible in Institute research portfolios as well as the importance of capturing the cross-cutting research areas such as ethics and women's health. The more substantial work needed to refine these Institute descriptions will be an early task of the Scientific Directors, drawing on community expertise and advice.

There may also be controversy over the actual names of the Institutes. In this working document, "names" are working titles only. Institute names will likely require professional work and expertise to properly and strategically represent the many audiences, including field/researcher, stakeholder identification, and public recognition.

MENTAL HEALTH, ADDICTION AND BRAIN

The goal of the Institute of Mental Health, Addiction, and Brain (IMHAB) is to resolve through research health issues related to the healthy development of human thought, emotion, behaviour, perception, and interpersonal/social relationships, and to the proper functioning of the mind, brain and nervous system, as manifested through normal behaviour. The work of the Institute emphasizes strategies designed to sustain and enhance mental, behavioural and neurological health, as well as approaches to preventing, caring for and, where possible, curing ill-health, addiction, and disability. This includes mental disorders such as schizophrenia, behavioural problems (particularly addiction), neurological diseases such as multiple sclerosis, and conditions which can impair our senses, such as glaucoma.

This Institute encompasses many different approaches and health research disciplines, at many levels of development. Successful collaboration and appropriate resource allocation across the biologically oriented neurosciences and the behaviourally or socially oriented mental health and addictions research communities poses a great challenge. The Institute will develop mechanisms to promote collaboration and cross-fertilization among research communities that have not traditionally collaborated, and ensure that the less well-established fields of research will benefit and not suffer from being folded into this large grouping.

The mutual influence of mind and body, in sickness and in health, represents one of the most exciting and varied of all research domains. Disorders of brain function, nervous system and behaviour powerfully impact individual and family life, burden the health care and social services systems, and disrupt the social network. Conversely, brain function, individual behaviour and levels of ability/disability are strongly influenced by conditions and stresses in the family, social and occupational environments. Increasing our understanding of these interactions will be critical to maintaining and promoting mental health in Canadian society, preventing and treating addiction and mental health problems, and minimizing the impact of mental and neurological disorders.

Current advances in genomics and imaging facilitate a more meaningful dialogue between the neurosciences and the behavioural sciences. The imminent completion of the human genome project will reveal a plethora of new brain-specific genes whose functions can only properly be understood in an environment which links studies of individual nerve cells to those probing human behaviour at the individual, family and societal level. Novel imaging techniques will allow insights into the function of neurons and neuronal systems, aided by the increased application of informatic and computational approaches. Rapid progress in therapeutics for previously untreatable neurological disorders will provide unprecedented opportunities for the application of the clinical neurosciences. These advances will also raise questions concerning their impact within the health care system.

While biomedical studies of the brain and nervous system hold great promise for the eventual treatment or prevention of mental and neurological disorders, there is also tremendous scope for expanding research from other perspectives that can contribute directly to the promotion of mental health and the

prevention, management and cure of addictions and mental illnesses. Psychopharmacological research is leading to dramatically improved clinical management of psychoses and mood disorders. Cognitive-behavioural strategies are emerging as powerful tools for addressing the symptoms of even biologically-based mental illnesses. Robust mental health, resilient attitudinal factors and positive psychosocial conditions are important in determining individual and population health and well-being. Psychosocial interventions and resources that build resiliency and promote mental health warrant thorough investigation over time.

Inclusion of the Four Themes

The Institute of Mental Health, Addiction and the Brain will support an integrated research agenda addressing all four themes of CIHR:

Basic biomedical research into the functioning of the nervous system, developmental neuroscience, the senses, and cognitive psychology.

Applied/clinical research into neurological and mental disorders, addiction and other behavioural problems.

Health services and systems research, including analysis and evaluation of health services for neurological, neurosurgical and mental health care (including addictions services).

Society, culture and the health of populations research, including promotion of mental health, population studies, and the study of ethical issues, social, cultural and economic impacts of disorders of the nervous system and behaviour.

Research Areas

The broad streams of research which will be supported within this Institute include:

Fundamental investigation into the functioning of the central, peripheral, and autonomic nervous systems, including: studies at the molecular, cellular and systems level, as well as theoretical and computational approaches to neuroscience; the application of imaging technologies to the understanding of normal and abnormal brain function; studies of genetic factors contributing to mental illnesses which show complex patterns of inheritance; and the interrelationships between stress, behaviour, and neuro-physiological, endocrinological and immunological processes.

Developmental neuroscience and cognitive studies, including: both prenatal biological processes and postnatal processes influenced by family and societal factors; cerebral palsy, spina bifida, the effects

of fetal alcohol and other substance use on the fetus; other pediatric neurological problems such as genetic, nutritional, toxicological and environmental factors affecting the development of brain and behaviour; and the neurobiology of substance abuse and dependence.

Studies of the senses and motor functions, including: vision, hearing, balance, smell, taste, voice, speech, and language. Special attention will be paid to the areas of vision and auditory health due to the widespread incidence of such disorders and their impact on quality of life.

Studies in cognitive psychology and other fundamental investigations into human behaviour such as: studies of consciousness, learning and memory, emotion, attention and neglect, motivation, reward and anxiety, sleep, feeding, appetite, circadian rhythms, gender differences in behaviour, personality traits, and sexuality.

Study of neurological disorders, including: stroke, degenerative (e.g. Alzheimer and Parkinson's) and demyelinating diseases (e.g. multiple sclerosis); neuromuscular disorders (e.g. amyotrophic lateral sclerosis), brain tumors, traumatic brain and spinal cord injuries, regeneration and recovery; neurological manifestations of metabolic, hereditary and infectious diseases; pain; epilepsy and migraine; autism; learning disabilities; and the effects of environmental neurotoxins.

Study of mental disorders, in all age groups, including: depression and other mood disorders; schizophrenia and other psychotic disorders; eating disorders, phobias, sociopathy, psychopathy, neurotic and personality disorders (from the perspectives of psychiatry, psychology, occupational therapy, social work, mental health nursing, forensic psychiatry and other disciplines, with appropriate integration of the perspectives of service consumers and family members); and assessment of pharmacotherapeutic, psychotherapeutic and psychosocial approaches to treatment, including clinical trials.

Study of psychosocial risk, resiliency and protective factors that predispose populations toward mental health such as: effective coping and stress management; and self-esteem, healthy relationships and life satisfaction.

Study of neurosensory conditions and interventions, including: ophthalmology and otolaryngology; speech therapy; audiology and optometry; prevention and treatment of vision and hearing loss; and eye disease, including glaucoma, diabetic retinopathy and central retinal degeneration.

Study of co-morbidity of addiction or substance abuse problems with mental, neurological, sensory or physical disorders, in particular mood disorders and psychoses (given that, for example, a high proportion of those with an addictive disorder also have a psychiatric disorder).

Novel therapeutic, rehabilitative and behavioural approaches to neurological disorder prevention, treatment and behavioural recovery, including: non-invasive stimulation, prosthetic technologies, stem

cell research, neural grafts, transplants and other novel neurosurgical approaches; anesthesia research; and brain and spinal cord injury prevention.
Addiction research, including: studies on cellular effects of drugs of addiction (alcoholism, substance abuse, compulsive gambling); pharmacological, cognitive-behavioural, community and motivational approaches to therapy; tobacco control and drug abuse education; and the influence of a full range of determinants of health in determining risk and protective factors to be addressed in developing effective preventive programs and policies (including genetic predisposition, gender, personality traits, family dynamics, culture, education, socio-economic status and social support systems).

Other psychological and behavioural problems, including: suicide/self-injury, risk-taking, criminality, violence, sexual abuse, and stress reactions (viewed from both individual and community perspectives); the impact of the full range of determinants of health (including gender, culture, socio-economic status and genetic predisposition) on the incidence and expression of psychological and behavioural problems, and the implications of the determinants for effective prevention and intervention; attention-deficit/hyperactivity disorder; and family and societal influences in behavioural disorders of childhood and adolescence.

Interaction of physical and mental health, including: chronic fatigue syndrome; seasonal and environmental disorders; the psychology of major illness and disability; the psychological/behavioural risk and protective factors for physical illness and injury; and the physical risk/protective factors for mental health problems and disorders.

Analysis and evaluation of health services for neurological, neurosurgical and mental health care (including addictions services) such as: analysis of related policies, programs and legislation and their health impact; management of neurological and psychiatric illness in acute, subacute, chronic and community settings; rehabilitation and other services for persons with movement, vision or hearing-impairment; independent living and quality of life studies; community and family support systems for those experiencing and recovering from mental illness and behavioural problems; self-help and mutual aid; psychosocial rehabilitation and skills development; interaction of programs, systems and services for addictions, mental disorders, neurological conditions, sensory conditions, primary health care, and health promotion; and the impact of the full range of health determinants on access to services and on service outcomes.

Mental health promotion, including: factors that foster coping skills and resiliency; stress management; effective parenting; life skills; healthy relationships; and the implications of the full range of health determinants for mental health promotion.

Interaction of violence (child abuse, early childhood aggressiveness and other problem behaviours, as well as socio-economic and cultural factors)with substance abuse.

Population studies of neurogenetic and psychiatric/behavioural disorders and mental health problems

(including substance abuse); the investigation of risk and protective factors for neurological and psychiatric disorders; and mental health inequalities among vulnerable and isolated communities (homeless, rural, aboriginal, low-income).

Ethical issues, including: the use of fetal material for treatment of neurological conditions; provision of services for those suffering from mental illness; ethical dilemmas of emotional neuroscience; ethical issues involved in psychiatric and psychological treatments; rationing of high-cost health services; and issues of treatment for those considered incapable of providing informed consent.

Socio-economic impact of mental, neurological and behavioural disorders and problems and socio-economic implications of alternatives for prevention, intervention, rehabilitation, palliation and mental health promotion.

Cross-cutting Activities

Key cross-cutting areas on which the IMHAB will expect to collaborate with other Institutes include: studies relating to fetal development and early childhood, as well as the neurological and behavioural disorders of ageing; ethical considerations relating to genetic, cultural, and mental health services issues; ethical issues arising from new remedies emerging from advances in biotechnology; mental and behavioural problems associated with physical illness and disability; mental health and addictions problems in Aboriginal and rural/remote communities; and neurological and mental health disorders which afflict women disproportionately, such as eating disorders and tranquilizer abuse.

There will be collaborative links with many of the other Institutes, for example with the Health Throughout the Life Cycle Institute in the area of neurodegenerative disorders of ageing, the early development of the nervous system and children's mental health.

Potential Partners (examples only)

Governments: (e.g. Health Canada, provincial governments and funding agencies).
Foundations and Voluntary Sector: (e.g. Alzheimer Society of Canada, Canadian Cancer Society, National Cancer Institute of Canada, Heart and Stroke Foundation of Canada, Multiple Sclerosis Society, Neuroscience Canada Foundation, Rick Hansen Institute, Schizophrenia Society of Canada, Mood Disorders Association of Canada, National Network for Mental Illness and Mental Health, and Canadian Mental Health Association).
Professional Societies and Networks: (e.g. Canadian Psychiatric Association, Canadian Congress of Neurological Sciences, Canadian Association for Neuroscience, Psychiatric Nurses Association, Canadian Stroke Network, British Columbia Centre of Excellence for Women's Health, (National Centres of Excellence)).

Private Sector: (e.g. Neuropartners Inc.).
International: (e.g. Japan-Canada Neuroscience Partnership, Human Frontiers Science Program).

ABORIGINAL AND INDIGENOUS PEOPLES

The ultimate goal of The Aboriginal and Indigenous Peoples Health Research Institute (AIPHRI) of CIHR is to equate the Aboriginal health status with that of the rest of the Canadian population. The research supported by the AIPHRI will address the significant and disproportionate burden of illness borne by the Aboriginal peoples of Canada; develop an approach to Aboriginal health research which effectively responds to the health needs of that community; develop a way to engage world class scientists, both Aboriginal and non-Aboriginal, in Aboriginal health research; and build a strong health research capacity and leadership within the Aboriginal community, particularly in underdeveloped areas such as biomedical research, by attracting a new generation of researchers in Aboriginal health to build on and expand current capacities.

The AIPHRI is an example of the transformative and innovative potential envisioned within CIHR. Aboriginal peoples have been wary of research because the process and agenda has not always met the needs of the community and has often been conducted without real community involvement. Aboriginal people have a view of health and well being which encompasses physical, mental, emotional and spiritual domains, as well as culturally rich traditional understandings and beliefs of health and health care. The Institute will open the door to the development and acceptance of alternative models of research methodologies developed in partnership with the Aboriginal community. It will design program structures, research and evaluation methodologies which uphold the highest standards of excellence and which also respect traditional approaches to health and health research.

Within the global context, Canada is considered a leader in Aboriginal health research with established international linkages and partnerships, and internationally acclaimed scientists included in the current Aboriginal health research community. CIHR has a unique opportunity to build on this international reputation for excellence and to attract the current critical mass of renowned international Aboriginal health researchers. The pooling, within the AIPHRI, of these capacities, together with the existing international links and partnerships, will create an environment where researchers will thrive under CIHR and create advanced health research knowledge in this field. This knowledge will significantly improve the health of Canadian Aboriginal people, and also of Indigenous peoples around the world. The AIPHRI has the potential to become a leading international centre for Aboriginal health research.

Inclusion of the Four Themes

AIPHRI will support an integrated research agenda addressing all four themes of CIHR:

Basic biomedical research will provide insight into fundamental physiological mechanisms and predisposing genetic factors of the aboriginal population and will identify differences in the major determinants of health status for Aboriginal and non-aboriginal populations.

Applied/clinical research will examine the efficacy of interventions aimed at prevention, control, clinical care and treatment (e.g. for diabetes, addictions, cardiovascular problems).

Health services and systems research will track patterns of service utilization, identify and demonstrate more effective ways to fund, organize and provide health services to better meet the needs of Aboriginal communities. Comparative studies between successful and non-successful adaptations will be most instructive in the design of future health practices.

Society, culture and health of populations studies will examine the interrelationships between cultural change, the values, beliefs and traditional healing practices, and lifestyle diseases. This research will provide an understanding critical for designing effective interventions and health promotions strategies.

Research Areas

The broad streams of research which will be supported within this Institute include:

Chronic diseases In the last half of this century, Aboriginal people have undergone an epidemiologic transition, from diseases primarily identified with infectious agents to chronic diseases influenced by a lifestyle of modern industrial nations. Research on chronic diseases will encompass: genetic and clinical epidemiology to investigate the higher incidence of cancer, diabetes and heart disease; cardiology research on heart disease and hypertension; endocrinology research on nutrition, diabetes and obesity; and oncology research on cancer incidence and prevalence. Research will also evaluate the outcomes of clinical interventions to aid in evidence-based decision making of community leaders, health managers and policy makers. Social, cultural and environmental research will also be pertinent fields.

Health determinants Aboriginal communities fare significantly poorer than the Canadian population in all socio-economic indicators. Research will elucidate the multi-dimensional factors that affect the health of a population, and investigate the effectiveness of strategies or approaches that seek to restore culture and traditional social practices (for example, the reasons why Aboriginal people are at increased risk for infectious disease are not fully known). A broad multi-disciplinary approach will be required, including: environmental sciences and toxicology research on the effects of air, water and soil contaminants, particularly on mothers and developing fetuses; linguistics and applied language research on the interface between health and literacy; and cultural anthropology, sociology and social geography to study the health effects of poverty and crowding.

Other important topics that will entail collaboration with other Institutes include: rehabilitation of children suffering the effects of Fetal Alcohol Syndrome (FAS); pre and post- natal health and nutrition, including the onset of glucose intolerance in children; research on obesity in females and consequences for development of coronary disease, stroke, diabetes, breast cancer and gall stones; the effects of

northern-based environmental hazards on human health (e.g. mercury, lead and pesticides); and the significance of traditionally harvested food to northern health.

International The Aboriginal peoples of Canada share many of the health challenges and concerns seen in other Indigenous peoples, and the opportunity exists for the AIPHRI, through CIHR, to be a leader in the promotion and learning across countries of effective strategies to improve the health of Indigenous peoples. International collaboration of the AIPHRI with research bodies in other countries will increase the immediate research capacity in this area, have a catalytic influence on the development of Canadian research capacity on Aboriginal health, and will facilitate the ability of the Institute to tap into international peer review expertise. Examples of collaboration may include: investigations into, and the sharing of knowledge about, the mechanisms by which protection of traditional lifestyles and cultural practices lead to better health among Indigenous peoples; improved measures to monitor health inequalities between Indigenous peoples and others; research into effective policies and practices in economic development or in specific sectors which affect the health of Indigenous peoples; and work into effective, culturally appropriate health interventions and strategies.

Health systems Accessibility and comprehensiveness of services are major issues in Aboriginal health systems. Approximately 50 percent of First Nations live on reserve, which presents unique challenges in terms of geography, isolation and size of population. As well, services are provided from two jurisdictions – provincial and federal – which operate largely as solitudes. Resulting health-related issues include: gaps in services due to unclear mandates of health and social agencies; reduced access to services in isolated or northern communities; cost-shifting of insured services between jurisdictions; and lack of continuity of care. Areas for investigation include: innovative health system design that integrates multiple jurisdictions; assessment of community control over health services; alternative primary care models; traditional healing practices and modern health care; telehealth; and cultural anthropology and social geography.

Infectious diseases Infectious disease rates among Aboriginal people are still significantly higher than the norm. The AIPHRI will improve the understanding of the immunological and epidemiological aspects of infectious diseases in Aboriginal peoples, and evaluate current prevention and control problems. The genetic and environmental bases of disease susceptibility and drug efficacy will be investigated.

Injury, disability prevention and health promotion Studies in psychology, sociology and cultural anthropology will focus on the development and evaluation of health promotion activities to reduce accidental death and disability and reduce diseases associated with lifestyle practices. Healthy living strategies require methodologies which are designed by Aboriginal people, incorporate culturally relevant practices, and are tailored to their community realities. A focus on youth will be an important component of the research.

Addictions and mental health Addictions (tobacco, alcohol, drug and gambling) are major health problems in Aboriginal communities. Suicide rates among Aboriginal people are significantly higher

among the rest of Canadians. Studies show that up to 75 percent of Aboriginal women have been the victims of family violence. As well, child and elder abuse are serious problems. Depression, youth suicide and substance abuse, and other psychological disorders among Aboriginal people are areas where much basic research is required, including: cultural, sociological and psychological research on effective intervention strategies (which embrace both traditional and Western elements); and research on the underlying and precipitating stressors to mental well-being, such as cultural alienation, unemployment and low income, lack of empowerment and the links among residential schools, health status and psycho-social dislocation. Epidemiological research will expand the existing knowledge of addictions and mental health, to span the whole Aboriginal population.

Cross-cutting Activities

Key cross-cutting areas on which the AIPHRI will expect to collaborate with other Institutes include those which focus on major causes of ill-health in Aboriginal peoples, including diabetes, heart disease and addiction. This Institute will address ethical considerations relating to genetic, cultural, and health services allocation issues, and ethical issues arising from new remedies emerging from advances in biotechnology. It will include cross-cutting research on women's health, such as gender issues in biomedical disease-based research and the inclusion of women and minorities in clinical research, and on northern and rural health determinants such as environmental hazards and health services access problems.

***Potential Partners** (examples only)*

Federal Government: (e.g. the Organization for the Advancement of Aboriginal Peoples Health, the Aboriginal Diabetes Initiative, the First Nations Health Information System (FNHIS), the Indian and Inuit Health Careers Program, Health Canada branches involved in Aboriginal health- related research, Department of Indian Affairs and Northern Development (DIAND), Environment Canada).
Provincial Governments: (e.g. Aboriginal health research institutes and strategies at the provincial level such as the Manitoba First Nations Centre for Aboriginal Health Research and Ontario's Aboriginal Healing and Wellness Strategy).
Academia: (e.g. University departments such as the Centre for Indigenous Nutrition and Education (McGill) and other native studies departments).
Foundations: (e.g. the Aboriginal Healing Foundation, the Heart and Stroke Foundation)
Associations and Societies: (e.g. The Aboriginal Nurses Association, the Assembly of First Nations, the Metis Society, the Inuit Tapirisat of Canada, the Canadian Association of Clinical Microbiology and Infectious Diseases, the Canadian Diabetes Association, the Arthritis Society and the Canadian Association for HIV Research).
International: (e.g. Organizations where international links will be forged include the World Health Organization (re: International Consultation on the Health of Indigenous Peoples), the International Union

of Circumpolar Health, the Danish Institute for Epidemiological Research in Greenland (Copenhagen), the Russian Academy of Medical Sciences, Siberian Branch (Novosibirsk), the Institute of Arctic Medicine (University of Oulu, Finland), the Native American Health Research and Training Centre (University of Colorado), the Native Health Research Centre (University of Arizona), the Indian Health Service (Atlanta, Georgia), the Queensland Institute of Tropical Medicine and Aboriginal Health (University of Queensland, Australia) and the Menzies Institute for Aboriginal Health Research (Darwin, Australia)).

CELL FUNCTION AND CANCER

The goal of the Cell Function and Cancer Institute is the acceleration of research that will seek improved ways to cure cancer, to prevent it, and to help individuals and families to live with it when neither prevention nor cure have been achieved. With the aging population, cancer deaths are expected to double during the next generation unless research can reduce the mortality. The goal of this Institute is to substantially reduce the burden of cancer during the next 20 years. To reach this goal will require a broad-based program that approaches problems of cancer from many directions.

Research will be stimulated into the abnormalities in cell function that result in cancer, and into their interactions with the variety of regulatory systems that may be capable of recognizing these abnormalities, repairing them, or blocking their contributions to the development of malignant disease. The identification of risk factors for cancer will permit the development of effective strategies for the prevention of cancer. Where prevention is not yet feasible, improvements in methods for diagnosis, treatment, rehabilitation and care will help to reduce the burden of illness associated with cancer. Research designed to foster and support the development of a comprehensive cancer control strategy will pay attention not only improvements in cancer services, but also to the promotion of the overall health and quality of life of Canadians in ways that take into account ethical, cultural and social issues.

Inclusion of the Four Themes

The Cell Function and Cancer Institute will support an integrated research agenda addressing all four themes of CIHR:

Basic biomedical research into mechanisms of cell function and differentiation related to tumour development and studies on the interaction of tumours with its host, including topics such as metastatic spread, angiogenesis, and interactions with the immune system.

Applied/clinical studies to develop and assess mechanisms and treatments to prevent, diagnose, ameliorate and eliminate cancer in patients, including traditional clinical trials to evaluate new therapies, chemoprevention, and testing of novel ways to classify tumours (e.g. by using microarrays to screen response to relevant genes) to improve therapy.

Health Services and Systems studies on effective cancer education, preventive practices and screening, rehabilitative services, palliative care, and health policy in a variety of health care delivery settings. A primary goal of these studies will be to identify best practices for policy makers to implement into the health care system.

Society, Culture and Health of Populations including studies of the impact of the environment

(physical, cultural, socio-economic and psychological) on susceptibility and response to cancer and its treatment, as well as the impact of cancer and its treatment on the individual and his/her environment. These studies will involve establishing the surveillance and monitoring systems and databases required to carry out the desired analyses.

Research Areas

The broad streams of research which will be supported within this Institute include:

Basic research, including: the biology, molecular biology and genetics of both normal and neoplastic cells, mechanisms of cellular differentiation and signalling; the role of cell-to-cell and cell-to-matrix interactions, and their interplay within organs and tissues; genetic predisposition, and mechanisms of deregulated growth; and the detection of genes which predispose people to cancer, that will identify novel environmental carcinogens, and permit new approaches to cancer control based on an understanding of how genes modify and interact with environmental exposures.

Translational research is needed in areas such as the identification of novel pre-neoplastic markers for the early detection of cancer and methods of screening and diagnosis (including studies to evaluate biomarkers for their ability to predict response to interventions). New discoveries from cell biology and genetics will lead to novel therapeutics and preventives based on interference with specific molecular targets in pre-malignant and malignant cells and in the surrounding tissues that sustain the growth and spread of the cancer. Extensive clinical testing of these new agents will be required through large, international clinical trials.

Clinical, epidemiological, socio-behavioural, and cultural research is needed in such areas as tobacco use, diet and exercise, stress management, diagnosis, and coping. Examples of important psychosocial issues include further investigation into counselling, support, and decision behaviours, such as the use of alternative and complementary therapies for cancer. Studies of etiological factors need to include research on genetic, environmental, socio-economic and occupational contributions to cancer risk. Research on knowledge, attitudes, and practices of the public, policy makers and health professionals related to care, prevention, early detection, treatment and rehabilitation of cancer is an essential part of a comprehensive cancer control strategy.

Cancer-related health services, including care-giving issues, such as who delivers care (including palliative care), where is that care best delivered, and how health system/services could be realigned to provide adequate support for patients; and technological developments (such as functional imaging) and their potential uses and costs to the system.

Disparities in the burden of cancer across populations, including issues of access to treatment for

low-income people, those in rural-remote settings, ethnic minorities and other potentially underserved populations.

Ethical issues related to cancer will form an important part of many projects, including studies related to: clinical interventions; predictive testing in minors; follow-up; duty to debrief family members; screening criteria; health services organization and delivery; risk and prevalence in populations; and population-based interventions.

Gender-based studies on types of cancer exclusively affecting one gender (e.g. breast, ovarian, testicular and prostate); and the exploration of the physiological, cultural and societal reasons for differences in gender incidence and prevalence of different types of cancers, and their reaction to treatment.

Cross-cutting Activities

There will be collaborations with other CIHR Institutes in many fields, including developmental cell biology, screening and diagnostic technologies, genetic, environmental and nutritional influences on cancer risk

Potential Partners *(examples only)*

Governments: (e.g. Laboratory Centre for Disease Control, Health Canada, Canadian Association of Provincial Cancer Agencies, provincial governments and funding agencies).
Foundations and Voluntary Sector: (e.g. Canadian Cancer Society; National Cancer Institute of Canada; Canadian Breast Cancer Research Initiative; Canadian Prostate Cancer Research Initiative).
Professional Associations and Networks:(e.g. Canadian Association for Nutritional Sciences; National Institute of Nutrition; Dieticians of Canada; Canadian Society of Exercise Physiology; Canadian Lung Association, Canadian Association of Nurses in Oncology, Canadian Association of Psychosocial Oncology, National Network on Environments and Women's Health, Maritime Centre of Excellence for Women's Health,).
Research Centres: (e.g. Centre for Research on Women's Health).
International: (e.g. International Agency for Research on Cancer, World Health Organization, National Cancer Institute (NIH, USA)).

SOCIAL, ENVIRONMENTAL AND GENETIC INFLUENCES ON HEALTH

The goal of this Institute is to accelerate our understanding of the complex relationships among the biological, behavioural, social and environmental factors which influence human health. It is at the interface and interaction of varying social/environmental factors and genetic variation that disease initiation takes place. The common pressing health problems seen in our society today are neither exclusively genetically nor socially determined: they will only be solved by greater integration between investigations into the influences of "nature" and "nurture". The Social, Environmental and Genetic Influences on Health Institute will support a broad scope of fundamental research into both the genetic and environmental factors affecting health, and their interaction.

The publication of the sequence of the human genome, expected soon, will stimulate a flood of research in related areas of functional genomics, proteomics, and structural biology. It will require increased emphasis on the insights provided through application of bioinformatics and computational biology. To translate this fundamental scientific resource into research which has the potential for improving the health of Canadians, it must understand how different human genomes interact with a range of differing physical and social environments to result in disease.

Environmental factors related to health include the range of physical environments in which we lead our lives for example, the quality and safety of our housing and work environments, the quality of the air, water and land around us, or food safety. Environmental circumstances play a key role in accident and injury avoidance, especially among children, and in the workplace. Long-term health consequences follow from environmental influences such as exposure to smog, to alcohol during pregnancy, or to excessive noise in inner-city communities. The primary approaches to investigating the environmental determinants of health to date have utilized epidemiological methods, physiological approaches (including toxicology), and chemistry, but there is growing capacity in the use of population health and genetic methodologies that can address interaction between the two domains.

Social experiences are also factors that are important to health. Such factors include gender expectations, education, and socio-economic status, which affect our individual and collective social experiences, behaviours, and resources available for coping with the demands of living. Social contexts influence health from conception through the entire life cycle, through impacts ranging from maternal nutrition, care and behaviours during pregnancy, to school and job opportunities, to economic stability during retirement. How these determinants interact with an individual's genetic makeup will influence whether the individual experiences good health, or the onset or progression of disease and dysfunction. There is evidence that behavioural patterns, psychosocial environments, socio-economic disparities, and social systems and structures affect the onset of some diseases, the progression of many, and the management of nearly all.

Inclusion of the Four Themes

The Social, Environmental and Genetic Influences on Health Institute will support an integrated research agenda addressing all four themes of CIHR:

Basic biomedical research into the most fundamental studies of genes, genomes and genetic mechanisms and regulation, from studies of genetic pathways that regulate normal human development, to the identification of genetic determinants of health at all stages of life. And, research into the effects of environmental factors such as heavy metals and endocrine disruptors, on human health, addressed through studies ranging from cell cultures through animal models and their interactions with gene expression and mutation.

Applied/clinical research providing information and insights from population studies for the prevention, diagnosis and treatment of disease, including gene therapy.

Health services and systems research into the development of the required health services delivery systems for prevention and treatment, including workplace and occupational health and injury and disability prevention. The cost effectiveness of the new genetic technologies will also be addressed.

Society, culture and health of populations research on: the use of population health and genetic methodologies that can address interaction between the two domains; studies of social, economic, educational and work policies which influence the health of populations; and the analysis of the ethical, social and legal implications of the new genetic technologies.

Research Areas

The broad streams of research which will be supported within this Institute include:

Genetics, including: genetic/genomic technologies and bioinformatics; molecular genetics and proteomics (including gene identification, sequencing, structure and function studies gene-gene and gene-genome interactions); gene regulation; proteomics and structural biology; individual human genetics (including medical and clinical genetics, diagnostics, cost effectiveness assessment, counselling, treatment and gene therapy); population genetics (including genetic determinants of health, polymorphisms, genetic epidemiology, and gene-environment interactions); social implications of the application of genetics (including population screening strategies, structures for and impacts of genetic testing and counselling, privacy and uses of genetic information, and the impacts on health and social services and systems); individual, community and population-based risk management strategies; and interactions between genetic information and society.

Population health and human development, including: analysis of the effects of socio-economic gradients on human development and health, and the role of genetics in understanding these gradients; psychobiological and psychosocial pathways and mechanisms leading to health/resiliency or disease and the role of genes in influencing these factors; population genetics; gender and cultural issues (including cohort and age-group subcultures); ethics, law, society, culture and health; the impact of social environment on resistance and vulnerability to disease; health impacts of economics, trade, globalization, distribution of wealth and resources; homelessness, neighbourhoods, transportation, and the built environment; social structures and networks and health; health disparities associated with race, ethnicity, gender, socio-economic status; social cohesion and health status; and policy research and implications.

Public and community health, including: public health of special populations (rural, remote, northern communities, immigrants/refugees); disease prevention and control; public and community health systems; health effects of the organization and delivery of health services; measurement of individual and community health status; surveillance/monitoring/information and data laboratories; epidemiology and biostatistics; environment, community and public health; health policy development; studies of health policy, administration and management; risk reduction and health behaviours; and the development of individual and community resiliency.

Environmental health, including research in: environmental diseases; environmental biology; cellular and physiological mechanisms of toxicity, food contaminants, drug toxicity, nutraceuticals and food additives; toxicology and pathobiology of responses to chemical, physical and biological agents in the environment; ecosystem health; research on bioengineered products (foods, drugs); clinical and health care management and the regulatory/legal aspects of environmental diseases; exposure science and exposure modelling; surveillance and data development; engineering aspects of exposure and modification; environmental issues in microbiology and infection; risk assessment; climate change and environmental modification influences on health; environmental noise/noise pollution impacts on health; sustainability; environmental risk perception; socio-economic analyses of causation, exposure, distribution and responses to environmental health impacts and risks; environmental justice and social change; and environment and ethics.

Health promotion, including: health knowledge and promotion; health education research involving patients, families and health-care providers; health promotion focussed on individuals, communities and populations; health knowledge and information management; health communications; screening programs; literacy and health; technology and health promotion; public policy issues in health promotion; and media and health promotion.

Injury and disability prevention, including: injury and accident prevention and control in the home, at work, on the street, and in sports and recreation; issues in the prevention of non-accidental injury and self-injury; occupational health and safety; risk assessment and risk management studies; promotion of health by ensuring safe working environments; disabling conditions of working-age populations and prevention strategies; social and economic impact of injuries and disability; cost-benefit analyses of

preventive measures; and the prevention of disabilities arising from acute or chronic illness (mental or physical).

Workplace and occupational health, including: examinations of physical, chemical, biological, and organizational factors in the workplace; studies of occupational diseases, injuries and disabilities; health hazards and work environments; psychosocial impacts of work and health; ergonomics; broad social and cultural determinants of occupational and workplace health; studies of social and economic costs of work-related disability and illness, recovery and care, and public policy issues.

Ethics, including: concerns about the explosive increase in genetic technologies; abilities to search for diseases that may appear later in life; implications of family members in genetic analysis of individuals; potential effects on employment or insurability; impacts on social custom and tradition; and how political, social and cultural realities adjust to new ethical perspectives for a healthy society which stem from genetic research and knowledge.

Cross-cutting Activities

Social, environmental and genetic influences will play an important role in understanding and improving health across all of the Institutes, and all Institutes could be expected to apply population health and genetic research methodologies as two key approaches to the major issues which challenge them. In order to support leading-edge research across all of CIHR, it is thus critical that this Institute build and strengthen these two fundamental research capacities.

Potential Partners (examples only)

Governments (e.g., Health Canada, Environment Canada, provincial and territorial ministries of health and the environment, regional health authorities, Statistics Canada, HRDC, CIHI/ CPHI, worker's compensation boards and their related research agencies).
Foundations (e.g., provincial medical/health research foundations, Max Bell Foundation, Laidlaw Foundation, Canadian Health Services Research Foundation).
Private Sector (e.g., Genome Canada, biotechnology and pharmaceutical companies, venture capitalists, banks, insurance companies, other large employers).
Voluntary Sector (e.g., disease organizations, national voluntary organizations).
Associations and Societies (e.g., Canadian Society of Epidemiology and Biostatistics, Canadian Association of Genetic Counsellors, Canadian Public Health Association, Canadian College of Medical Geneticists, Canadian Association of Population Therapeutics, Canadian Consortium for Health Promotion Research Research Centres/ Networks (e.g., other CIHR institutes, Institute for Work and Health Canadian Genetic Diseases Network).
International (e.g., World Health Organization, Texas Institute for Society and Population Health, The

International Centre for Health & Society, UK).
Policy Research Centres (e.g. Canadian Policy Research Network, Canadian Centre for Policy Alternatives, Caledon Institute for Social Policy, Centres of Excellence for Women's Health).
Labour Unions/Employee Associations (e.g. Canadian Federation of Labour (CFL), Canadian Labour Congress (CLC), Canadian Union of Public Employees (CUPE)).

GENETICS AND HEALTH

The goal of this Institute is to support research in all aspects of genetics related to human health and disease, including the interaction of genetics with the physical and social environment.

Genes in Development and Disease Human development, from the moment of conception, is influenced strongly by a genetic program. Alterations or disruptions to this program may result in profound birth defects, mental handicap, and altered prospects for a healthy life. Mutations may be inherited or may be the result of a physical or chemical insult to the developing embryo. Even in the absence of mutation, the inherited genes interact we inherit in interaction with varying environments to determine lifetime susceptibility to disease and our ability to lead a long and healthy life. Identifying the genes that influence health status will be one of the achievements of the Human Genome Project and will dominate health research in the 21st century.

It is important to consider how different genes interact in an iterative way, over time, with different environmental experiences and exposures.

The Physical Environment. The physical environment may contain physical or chemical agents that act directly or indirectly on our genes or on our physiology, to compromise the ability to thrive and survive. Understanding the interaction between genes and the environment is a major part of modern health research, and a logical extension of the Human Genome Project.

The Social Environment. Gender, ethnicity, education and socio-economic status affect our individual and collective social experiences. They play a profound role in human health and interact with different genotypes to shape our health status. Genes clearly influence intelligence, creative abilities and human behaviour. The interplay between human genes and the social environment is a largely untapped area of research.

Inclusion of the Four Themes

The Institute of Genetics and Health will support an integrated research agenda addressing all four themes of CIHR:

Basic biomedical research into: genetics, from gene structure and function through gene expression and regulation, to identification of encoded proteins and determination of their structure and function; genomics and proteomics; identification of genes that regulate normal development and contribute to developmental defects in humans, through study of a variety of organisms from simple bacteria and yeast, through model organisms such as nematodes and fruit flies to complex mammals, including mice and humans; the genetic determinants of human health throughout life, and characterization of genes that are

defective in disease states or that contribute to disease susceptibility; the interactions between genes and the environment, environmental mutagens, carcinogens and teratogens; and pharmacogenetics.

Applied/clinical research into the diagnosis, prevention and treatment of genetic diseases and common diseases with a genetic component. Development of inexpensive and highly accurate diagnostic tests will be a priority. Knowledge of disease genes and their protein products will provide new molecular targets for "designer" drugs. Gene therapy, development of new vectors for gene delivery, targeting of genes to specific cells or tissues, and the creation of highly specific gene expression cassettes to ensure gene expression in the appropriate tissues and cells will also be addressed.

Health services and systems, including converting genetic knowledge into new genetic services (diagnostic testing, genetic counseling, therapeutic intervention) and integrating them into the health care system; research on new diagnostic tests and new technologies that will reduce cost and improve reliability; and population screening for genetic conditions where there is some demonstrated cost effective benefit to the population. The Institute will develop programs with the Health Systems Institute to assess the costs, risks, and benefits of genetic screening.

Society, culture and health of populations research, including the social, ethical and legal issues related to the translation of genetic information into new products and services. These issues will be carefully studied, including research on the privacy of genetic information and the use of such information by the insurance industry and in the workplace. The Institute will also work closely with governments to develop policies and funding mechanisms to ensure equitable delivery of genetic services.

Research Areas

The broad streams of research which will be supported within this Institute include:

Genetic/genomic research into technologies and bioinformatics.

Molecular genetics, including: gene identification, sequencing, structure and function studies; gene regulation and human development; proteomics; and gene-gene and gene-genome interactions.

Identification of genes, including those that regulate normal development and contribute to developmental defects in humans through study of a variety of organisms from simple bacteria and yeast through model organisms such as nematodes and fruit flies to complex mammals including mice and humans.

Individual human genetics, including: medical and clinical genetics; diagnostics, counseling, treatment and gene therapy; and gene-organism interactions.

Population genetics, including: genetic determinants of health, polymorphisms, genetic epidemiology; and gene-environment interactions.

Social genetics, including: population screening strategies (broad and targeted), structures for and impacts of genetic testing and counseling; privacy and uses of genetic information; impacts on health and social services and systems; individual, community and population-based risk management strategies; and interactions between genetic information and society.

Cross-cutting Activities

The interplay between human genes and the social environment is a largely untapped area of research. A significant commitment of this Institute will be to encourage strong collaborative research programs with the Institute of Population Health, Social and Environmental Determinants.

Potential Partners (examples only)

Governments: (e.g. Canadian Biotechnology Advisory Committee, Genome Canada, Canadian Genetic Diseases Network, Health Canada, Quebec Network of Applied Genetic Medicine (RMGA/FRSQ) provincial governments and funding agencies).
Foundations and Voluntary Sector: (e.g. Foundation for Cell and Gene Therapy).
Professional Associations and Networks: (e.g. Canadian Association of Genetic Counselors
Canadian College of Medical Geneticists, Canadian Institute for Advanced Research, National Network on Environments and Women's Health).
Research Centres: (e.g. Centre for Research on Women's Health).
Private Sector: (e.g. Algene, Milestone Medica, BioCapital).

POPULATION, HEALTH, SOCIAL AND ENVIRONMENTAL DETERMINANTS

Researchers in the Population Health, Social and Environmental Determinants Institute will investigate the complex interactions of a broad range of conditions and factors that determine the health of individuals and communities and affect entire populations. These include the physical and psychosocial environments in which we live and work, gender issues, cultural influences (broadly interpreted), social support networks and structures, economic conditions, resource disparities, accessibility and appropriateness of health care, and the interaction of biological factors with social and environmental determinants of health. Since neither genes nor environment alone determine good health, it is important to understand what happens at the intersections of genetic inheritance and development.

Growing recognition of the powerful influence of behavioural, social, cultural, economic and environmental factors on health, illness, disability and injury has increased the necessity for high-quality, interdisciplinary research integrating the biomedical, clinical and social sciences perspectives. The presence or absence of disease is only one determinant of health status: the path to health or illness is more complex, and our health interventions need to reflect this. Gender, education, and socio-economic status affect our individual and collective social experiences, environment, behaviours, and resources for coping with the demands of living. These may be such that they lead to good health for individuals and communities, or they may be such that they contribute to the onset or progression of disease and dysfunction. There is evidence that behavioural patterns, psychosocial environments, socio-economic disparities, and social systems and structures affect the onset of some diseases and community health problems, the progression of many, and the management of nearly all.

Researchers in this Institute will seek to understand why and how some people remain healthy or get well easily, while others become sick or injured, or do not recover well. They will aim to develop strategies and interventions to counteract those negative influences on health and catalyze or strengthen the positive influences on health. The range of strategies and interventions studied would include health promotion, public health, disease and injury prevention, diagnosis, treatment and recovery, prevention of disabilities and rehabilitation.

Inclusion of the Four Themes

This institute will pursue an integrated research agenda addressing all four cross-cutting themes of CIHR:

Basic research (biomedical, social, community, etc.) into defining, measuring and identifying the major determinants of, and their relative contributions to, population health in Canada (e.g. biological, social, economic, developmental, environmental).

Applied/clinical research to develop more effective ways to improve overall population health (e.g., public health, education and environmental policies and programs).

Health services and systems research to identify and evaluate how health services and other related interventions (socio-economic, educational, environmental, etc.) could be implemented to promote overall population health.

Society, culture and health of populations research into cultural and societal beliefs, ethics, values and expectations concerning health, the human life cycle and the acceptability of different interventions to promote and protect individual and overall population health.

Research Areas

The broad streams of research which will be supported within this Institute include:

Population health and human development, including: population aspects of human development through the life cycle; socio-economic gradients in human development and health; psychobiological and psychosocial pathways and mechanisms leading to health or disease; population genetics; population determinants of health; health inequalities, exclusions, and resource disparities; gender and cultural issues, including cohort and age-group subcultures; ethics, law, society, culture and health; impact of social environment on resistance and vulnerability to disease; the health impacts of economics, trade, globalization, distribution of wealth and resources; homelessness, neighbourhoods, transportation, and the built environment; social structures and networks and health; health disparities associated with race, ethnicity, gender, socio-economic status; social cohesion and health status; and policy research and implications.

Public and community health, including: public health of special populations (rural, remote, northern communities, immigrants/refugees); disease prevention and control; public and community health systems; health effects of the organization and delivery of health services; measurement of individual and community health status, surveillance/monitoring/information and data laboratories; epidemiology and biostatistics; studies of health policy, administration and management; risk reduction and health behaviours; and the development of individual and community resiliency.

Environmental health, including research into: environmental diseases; environmental biology; cellular and physiological mechanisms of toxicity, environmental and food contaminants, drug toxicity, nutraceuticals, and food additives; toxicology and pathobiology of responses to chemical, physical and biological agents in the environment; ecosystem health; bioengineered products (foods, drugs); tools and methodologies (epidemiology and biostatistical methods); clinical and health care management, and regulatory/legal aspects of environmental diseases; exposure science and exposure modelling; surveillance and data development; engineering aspects of exposure and modification; environmental issues in microbiology and infection; risk assessment; climate change and global ecological changes; influences on health; ioniozing and non-ionizing radiation impacts on health; sustainability; environmental risk perception; socio-economic analyses of causation, exposure, distribution and responses to

environmental health impacts and risks; environmental justice and social change; and environment and ethics.

Health promotion, including: health knowledge and promotion; health education research involving patients, families and health-care providers; health promotion focussed on individuals, communities and populations; health knowledge and information management; health communications; screening programs; literacy and health; technology and health promotion; public policy issues in health promotion; and media and health promotion.

Injury and disability prevention, including: injury and accident prevention and control in the home, at work, on the street, in sports and recreation; issues in the prevention of non-accidental injury and self-injury; occupational health and safety; risk assessment and risk management studies; promotion of health by ensuring safe work environments; disabling conditions of working-age populations and prevention strategies; social and economic impact of injuries and disability; cost-benefit analyses of preventive measures; and prevention of disabilities arising from acute or chronic illness (mental or physical).

Workplace and occupational health, including: examinations of physical, chemical, biological, and organizational factors in the workplace; studies of occupational diseases, injuries and disabilities; health hazards and work environment; psychosocial impacts of work and health; ergonomics; broad social and cultural determinants of occupational and workplace health; studies of social and economic costs of work-related disability and illness; recovery, care and rehabilitation; and public policy issues.

Ethics issues related to: health disparities arising from race, ethnicity, gender; ethics of sustainability and "environmental justice"; population studies; consent and confidentiality of data; and cost/benefit approaches to environmental health problems.

Social determinants of women's health, including research on special health problems related to childbearing and societal values; economic conditions; and women as consumers of health services.

Cross-cutting Activities

Social and environmental determinants will play an important role in understanding and improving health across all of the Institutes, and all Institutes could be expected to apply population health research methodologies as a key approach to the major issues which challenge them. In order to support leading-edge research across all of CIHR, it is thus critical that this Institute build and strengthen this fundamental research capacity.

***Potential Partners** (examples only)*

Governments (e.g., Health Canada, Environment Canada, provincial and territorial ministries of health and the environment, regional health authorities, Statistics Canada, HRDC, CIHI, including CPHI, Worker's Compensation Board, Ministries of Labour).
Foundations (e.g., provincial medical/health research foundations, Max Bell Foundation, Laidlaw Foundation, Canadian Health Services Research Foundation).
Private Sector (e.g., banks, insurance companies, and industry).
Voluntary Sector (e.g., disease organizations, national voluntary organizations).
Labour Unions/Employee Associations (e.g. CLC, CUPE, CFL).
Associations, Societies and Networks (e.g., Canadian Society of Epidemiology and Biostatistics, Canadian Public Health Association/ its provincial affiliates, Canadian Council for Social Development, Centre pour l'étude des interactions biologiques entre la santé et l'environnment (CINBIOSE)).
Research Centres (e.g., other CIHR institutes, Manitoba Centre for Health Policy and Evaluation, Atlantic Centre, Centre for Health Policy Research in Education, Institute for Work and Health, Toronto, IRSST, Montreal, Centres of Excellence for Women's Health).
International (e.g., World Health Organization, Pan-America Health Organization, Texas Institute for Society and Population Health, The International Centre for Health&Society, UK)
Policy Research Centres (e.g. Canadian Policy Research Networks, Canadian Centre for Policy Alternatives, Caledon Institute for Social Policy).

HEALTH SYSTEMS: CARE, HEALING AND RECOVERY

The goal of the Health Systems: Care, Healing and Recovery Institute is to support research examining the health care organizations, services, technologies, methodologies, policies, and professions that are integral to the Canadian health care system, with the objective of bringing about quality care, improved rehabilitation and social integration, and an enhanced quality of life for all Canadians. It will respond, through research, to the high priority Canadians place upon protecting and enhancing quality health care and an effective health care system.

The work of this Institute will support a broad examination, at the levels of both health care users and health systems, of the factors that influence the health services and health care that Canadians receive. It will contribute to the development of evidence to improve the quality of care and the efficiency and effectiveness of the health care system. This Institute will support research in the development and assessment of health technologies and assistive devices, which have an important impact upon the quality of health care services, and people's functionality.

Inclusion of the Four Themes

The Health Systems: Care, Healing and Recovery Institute will support an integrated research agenda addressing all four themes of CIHR:

Basic biomedical research underpinning the development of health technologies, methodologies and services that enhance diagnosis, care, healing and coping. This includes such areas as pharmaceutical sciences and biomedical engineering. The Institute will stimulate collaboration among imaging scientists and biologists, chemists, and physicists to advance imaging research as applied to health care.

Applied/clinical research recognizing the essential link between health research and the care that Canadians receive. This Institute will support clinical evaluative research, including clinical trials, quality of life assessments, and outcome assessments.

Health services and health systems research on health services and health systems, at the levels of health care consumers, providers, managers and policymakers. This Institute will support research to underpin innovations in the organization, financing, equity and efficiency of health care delivery.

Society, culture and health of populations research that examines how health care and health services are influenced by broader societal issues such as inequality in access, cultural phenomena, and the human experiences of illness, disability and treatment in the health care system.

Research Areas

The broad streams of research which will be supported within this Institute include:

Health Policy, including: comparative international health systems; case studies of best practices; health financing; professional regulation; provider payment mechanisms; values in health systems; cross-jurisdictional issues; role of the public and the professions in policy development; influence of demographics and technology; and governance and accountability.

Organization and management of health systems, including: health care systems and organization; comparative international health systems; centralization/decentralization of health services; public/private mix of services and products; integrated health systems; health services for at-risk communities; planning, management and administration of human resources and training of professionals; provider payment mechanisms; participation in decision making; decision analysis; sociology of organizations; location/place in health care systems; and mechanisms for information management.

Care and care delivery, including: delivery of care and the professions delivering this care, across the full range of care settings (such as diagnostic care, palliative care, intensive/critical care, emergency care, primary care, rehabilitative care, home care, informal/family care, community care); continuity of care; physiotherapy, rehabilitation, rehabilitative process, occupational therapy, telehealth, healing, wound-repair, provider/client interactions, consumer empowerment, and self-care; medical humanities, healing rituals, religion, spirituality, care for special populations and immigrant health care; adaptation to and management of intractable chronic health problems; and how patients individually, and as groups, see themselves and how health and disease are portrayed to others, all of which influence options for prevention, treatment, and therapy.

Alternative and complementary medicine, including research on a variety of alternative, complementary or traditional therapies such as: chiropractic, acupuncture, naturopathy, massage therapy and unconventional physical therapies; and traditional aboriginal practices and oriental medicine.

Primary Care, including research focused on primary care and first point of contact; family medicine; primary care reform; provider/client interactions and provider payment mechanisms; human resources mix; decision-making/risk assessment; referrals and system impacts; comparative primary care settings; patient populations; and community development services, health promotion, and disease prevention.

Rehabilitation, including research on the continuum of the rehabilitation process; and integrated studies of the disability process (impairment, disabilities, handicap and social integration) of persons with neurological skeletal and sensory impairment and work related disorders.

Nursing and care giving, including research into nursing and care-giving for people across the

lifespan, from the effective management of clients during illness and recovery, to care at the end of life, to the reduction of risks for disease and disability and the promotion of health in the community. Research will also be conducted in such related areas as: the variety of environments in which nursing and care giving occur; caregiver/client relations; human resources policies; secondary care givers; and at-risk and special needs care.

Development, assessment and delivery of health technologies for care and healing, including: drug design, development and delivery, therapeutics, diagnostics, vaccines, and microelectronics; medical devices, assistive devices, and prosthetics; pharmacology, medicinal chemistry, molecular modeling, structural biology, crystallography (and other physical and chemical disciplines related to - drug discovery and development); drug metabolism, biopharmaceuticals, safety and toxicity, tissue engineering, and bioengineering; medical imaging, radiotherapy, nuclear medicine, ultrasound, and lasers; risk assessment, optimization of therapy, technology assessment, and post-marketing surveillance; and pharmacy services, prescribing, dispensing, pharmaco-economics, pharmaco-epidemiology, pricing, benefit plans, and regulatory issues.

Health outcomes and evaluation of services, including: clinical evaluation; clinical trials; clinical guidelines and clinical epidemiology; health economics and quality of life measurement; bioethics and health law; and program evaluation.

Methodological development, including: clinical trials methods, economic evaluation, statistics and biostatistics, epidemiology, case studies, diagnostic tools, surveys, longitudinal cohort studies, large-scale social experiments, and research dissemination .

Ethical issues such as: resource allocation in health services; equity; bioethics and health law; ethical issues related to therapeutics; and services offered, for example, reproductive technologies.

Cross-cutting Activities

The mandate of this Institute will also include the examination of gender issues related to health services, such as sources of informal care and the participation of women in clinical research. It will incorporate assessment of information technologies and their role in the management and effectiveness of services and systems. The Institute will also have a role in the transfer of knowledge into the health care system in terms of improved practices and policies, and in the development of new cost-effective health products in Canada.

***Potential Partners** (examples only)*

Governments: *(e.g.* Health Canada, provincial and territorial governments and funding partners, Regional Health Authorities Institute for Clinical Evaluative Studies Canadian Health Services Research Foundation, Canadian Institute for Health Information, Canadian Coordinating Office for Health Tech[illegible]logy Assessment)

Professional Associations, Societies and Networks: (e.g. Canadian Medical Association, Canadian Nurses Association, Canadian Pharmacists Association Cochrane Collaboration, Canadian Association of University Schools of Nursing, HEALNet (NCE), National Coordinating Group on Healthcare Reform and Women).

Research Centres: (e.g. Prairie Women's Health Research Centre).

Industry and Private Sector: (e.g. Rx&D, Canadian Drug Manufacturers Association, Canadian Medical Devices Association)

HEALTH THROUGHOUT THE LIFE CYCLE

Research supported by the Health Throughout the Life Cycle Institute will deal with the entire life course, encompassing four broad stages of human development, including reproduction, growth, development and ageing. Ultimately the goal is improved understanding of these processes which will enable us to optimize the health and quality of life of children and adults across all age groups.

This Institute will provide a focal point for research on: reproductive health, growth, and development; child and youth health; the study of the impact of life course events on health during adulthood and later years; and the study of ageing. It will investigate the origins, causes, treatments of diseases, conditions and disorders which are related to developmental or ageing processes and consider how events and behaviours at earlier stages of life influence health at later stages. It will study the mechanisms and processes of normal human growth, development and ageing, and of successful ageing. Researchers will investigate measures to foster and promote health and to prevent disease and disability throughout the life course. Researchers in this Institute will also focus on how to restore or maximize individual potential and functional capacity when disease, injury, or a chronic disorder intervenes in the developmental process.

Researchers will address the causes of health status disparities that develop across the life course among sub-populations (e.g., cultural, socio-economic, gender, or geographically defined sub-populations). They will study the causes and consequences of differences by gender and sex in patterns over the life course of development, morbidity, mortality and health services utilization, and seek to understand the factors which mediate these differences. They will address the questions of how to most appropriately organize and deliver health services for different age and gender groups within the population, and how to sustain high quality health care in face of changing demographics.

In addition to supporting research within each life stage (e.g., childhood, old age) within the life cycle, this Institute will support research that crosses the age boundaries. By bringing together researchers with expertise in the different stages and aspects of human development, this Institute will create a research environment conducive to new understanding of the relationships among life events, behaviours, developmental processes and health outcomes that may be temporally distant.

Events in the early years or mid-life can have far-reaching effects on health in later life. For example, diseases which usually manifest in later life – such as osteoporosis, cardiovascular disease, cancers, some mental disorders, obesity, and adult-onset diabetes – may be related to a complex mix of genetic factors, early or middle life events, factors in the physical and social environment, lifestyle, diet, and behavioural choices earlier in life. Congenital conditions, perinatal problems, or childhood diseases, abuse and injuries can affect the individual's functional capacity and quality of life throughout the remainder of life, including mental health and risk- taking behaviours later in life. Health and resilience at each stage of life is supported through healthy lifestyles, supportive families and communities, healthy environments, and good nutritional choices. Better understanding of the interplay of these factors and

their impacts on health throughout life will also help to lead to the development of effective health promotion measures, policies and practices for all age groups, and of appropriate and effective treatment and care of those who are ill or disabled in adulthood or later life.

Inclusion of the Four Themes

The Health Throughout the Life Cycle Institute will support an integrated research agenda addressing all four themes of CIHR:

Basic biomedical research into human reproduction, development and ageing.

Applied/clinical research into infertility, reproductive disorders, childhood diseases, and diseases and conditions associated with ageing.

Health services and systems research into the delivery of health information and care to special populations defined by their stages of the life cycle; and adaptation of the health system to a changing mix of needs due to demographic trends.

Society, culture and the health of populations research into societal and environmental influences on health at different stages of the life-cycle.

Research Areas

The broad streams of research which will be supported within this Institute include:

Molecular, clinical and epidemiological research on women's and men's health, such as issues related to reproduction, fertility and its regulation (including reproductive behaviour and choices of individuals and populations), and infertility.

Factors that affect pregnancy and fetal development such as: the relationship of maternal nutrition, obesity, infections, drugs, preterm labour, low birth weight, impaired intellectual development and other outcomes; studies of substance abuse and addictions in relation to pregnancy and fetal development; research on maternal health and care in pregnancy; research in newborn care; and the role of genetics and environmental impacts on maternal health and fetal development.

Studies of physical, mental, behavioural and social growth and development through infancy, childhood and adolescence, including biomedical research on acute and chronic illnesses of children and youth.

Basic molecular, cellular and genetic research on the mechanisms of ageing.

Reproduction, including research into: infertility, reproductive disorders; diseases of childhood and maturity; and obstetrics, gynecology, neonatology and pediatrics.

Geriatrics, including clinical research on the particular medical needs and problems of older adults and the development of geriatric assessment tools.

Life-cycle-related interventions, including therapies, treatments and care appropriate to different stages of development or age groups.

Organization and delivery of health services for the different stages of life, including the impact of urban/rural dwelling on the need for services and on the appropriate organization and delivery of services to those at different stages in the life cycle.

Epidemiological impacts of demographic and social changes over time, including studies of the changing population in terms of its health, social, demographic and functional characteristics and the implications of these changes for the health system.

Cross-sectional and longitudinal studies, including data base development as well as tools and methodologies required to support research across the life stages.

Quality of life and care near the end of life, including bereavement, family caregiving and their impacts on health.

Social, cultural, psychological determinants of health across the life cycle, including the impact of community and urban (versus rural living) on development and health through the life cycle.

Ethics, bioethics and applied ethics across life cycle stages, including: the implications of improved genetic understanding; ethics in the application of health care and reproductive technologies; ethics in the allocation of finite health care resources; ethical issues surrounding end-of-life care; health care decision making for those unable to participate fully in decisions concerning their own care; age-appropriate care; quality of life measurement at different stages of life; and the balance between length and quality of life.

Life cycle perspective studies, including research into: disabilities (motor, auditory, visual, speech and language, psychological and intellectual), and the experience of disability by individuals of all age, sex and gender groups; rehabilitation; social participation and integration into the community of individuals with disabilities; delivery of health services and related supports to persons with disabilities and their families; prevention of conditions and events leading to disability; and product safety and safety in the built environment for all age and sex groups.

Studies of physical, mental, behavioural and social growth and development through infancy, childhood and adolescence, including: social and behavioural studies into the roles of possible precipitating stressors (social, familial, economic, cultural and gender based); factors affecting such risk behaviours as substance abuse; factors influencing resilience or vulnerability to disease or health risks; and parenting styles, attachment patterns, and family structure, and their impacts on health and development.

Life course perspective on gender and health including: interactions of sex and gender with health status and health system utilization; basic understanding of the impacts of sex and gender on health over the life cycle; tools and methodologies required to appropriately incorporate sex and gender factors in health research; and consequences of sex and gender for understanding human health, prevention, care and treatment.

Studies of life stage transitions (e.g. starting school, leaving the parental home, transitions to marriage, work, parenthood, divorce, retirement, widowhood), and their impacts on later health and understanding successful, productive, meaningful ageing.

Cross-cutting Activities

Sex and gender differences profoundly influence human development at all stages in the life course. Therefore, the study of the effects of sex and gender, and the interplay of these variables with developmental processes and life events to affect health, will be integral to the work of this Institute. Men's and women's reproductive health will also be a major focus.

A wide range of ethical issues will be addressed, including: the application of reproductive and genetic technologies; age-appropriate use of health technologies; issues surrounding end-of-life care; substitute decision making for those unable to participate fully in decisions regarding their own care; and appropriate allocation of health system resources across the life cycle.

Partnerships will develop with several other Institutes, including the Institute of Nutrition, Hormones, and Metabolic Health in the area of reproductive endocrinology, and the Institute of Mental Health, Addiction and the Brain in the areas of child mental health.

Potential Partners (examples only)

Governments: (e.g. Health Canada, provincial and territorial governments and funding agencies, regional health authorities, Status of Women Canada, Environment Canada, Statistics Canada, Human Resources Development Canada, Indian and Northern Affairs Canada, Human Resources and Development

Canada, The Canadian Institute for Health Information (CIHI), Canadian Health Services Research Foundation (CHSRF)).

Foundations and Voluntary Sector: (e.g. provincial medical/health research foundations, hospital-based research foundations).

Research Centres: (e.g. Centre for Research on Women's Health).

Professional Associations and Networks: (e.g. Canadian Institute of Child Health; Canadian Association on Gerontology; Canadian Association of Pediatric Hospitals; Canadian Academy of Child Psychiatry; Canadian Society of Geriatric Medicine; Vanier Institute of the Family; College of Family Physicians; Society of Obstetricians and Gynaecologists of Canada; Canadian Pediatric Society; Canadian Mental Health Association; Canadian Psychological Association; Canadian Council on Social Development; Canadian Policy Research Network; Canadian Healthcare Association, Canadian Council on Social Development, Centres of Excellence for Women's Health, Canadian Women's Health Network, Centres of Excellence for children's Well-being).

HUMAN DEVELOPMENT AND CHILD HEALTH

The goal of the Institute for Human Development and Child Health will be to support and disseminate research encompassing male and female reproductive biology, pregnancy, embryonic and fetal development, newborn care, maternal health, family health, development of children, youth and mid-life adults.

Research will encompass acute and chronic illnesses of children, youth, and mid-life adults; and injury control, public health, intervention strategies, and health promotion. The Institute will provide a focal point for research on the critical interaction between childhood development and social, economic and cultural factors among the important determinants of health and well-being in later life. Researchers in basic biomedical science, clinical and applied health, health services, health care systems, and behavioural and social sciences will work together to improve the health of Canadian children, youth, young adults, mothers, and families. Research issues include applications of the advances in genetics and fertility, and highlight the importance of the ethical use of this new knowledge.

Inclusion of the Four Themes

The Human Development and Child Health Institute will support an integrated research agenda addressing all four themes of CIHR:

Basic biomedical research into male and female reproductive function, fetal development and pregnancy, child development and behaviour.

Applied/clinical research into improved contraception, infertility, disorders of pregnancy, childhood health problems and generally the disciplines of obstetrics, gynecology, neonatology and pediatrics

Health systems and services research on the delivery of services to mothers during and after pregnancy; and home, community and school-based care for children and adolescents.

Society, culture and health of populations research examining the impact of cultural, societal and environmental effects on pregnancy, the family and its influence on child development and adolescence.

Research Areas

The broad streams of research which will be supported within this Institute include:

Molecular, clinical and epidemiological research on women's and men's health issues related to: reproduction, fertility and its regulation; infertility; evaluation of the safety and effectiveness of contraceptive methods; and studies on abortion. Behavioural and social science research will focus on the advances and applications of fertility research and on the causes and consequences of reproductive behaviour of individuals and populations, including ethical issues in the use and application of fertility research, and ethical issues involved in fetal research and cloning. The issues of competence and consent will need to be examined.

Reproduction studies on: normal pregnancy and the factors that adversely affect pregnancy and fetal development (such as the relationship of maternal nutrition, obesity, infections, drugs, tobacco use and preterm labour to subsequent low birth weight, impaired intellectual development and other outcomes). Prevention of preterm births requires a better understanding of contributing social factors, as well as molecular and physiological understanding of the onset of preterm labour, its causes and control.

Newborn care research into sudden infant death syndrome (SIDS) and ways to minimize the deleterious effects of low birth weight and prevent mortality.

The role of genetics will be core to understanding, diagnosing, preventing and ultimately treating the genetic disorders that result in birth defects.

Environmental research will be encouraged to examine the effects of pollutants (such as chemicals and noise), on the growth, maturation and illness of fetuses and children and possible effects on respiratory health, the development of the brain, gender orientation, endocrine and immune systems as well as on childhood/adult onset cancers.

Biology, including studies at the molecular, cellular, and system levels, as well as in developmental biology, genetics, neurosciences, nutrition, endocrinology, behavioural sciences, social sciences and epidemiology, that will identify the requirements for optimal physical, social, emotional, and mental and behavioural growth and development through infancy, childhood, adolescence and early adult years. Biological scientists will study acute and chronic illnesses of children and youth while social and behavioural scientists will undertake research into the roles of possible precipitating stressors; social, familial, and societal (including sex and gender-based differences).

Studies to assess child temperament and personality characteristics as factors influencing health outcomes will also be encouraged. Other research areas will examine the possible impact of various media on normal, abnormal and violent behaviour as well as evaluate approaches to treatment and prevention.

Research on families, including studies on: parenting styles, attachment patterns, family structure, family socio-economic status, and impacts of recurrent cycle of poverty within families; and the effects of these factors on child development, youths and health of families. The ameliorating negative effects of these factors and developing methods of intervention are other important goals.

The study of adolescent health includes research into the challenges of transitions to: puberty, high school/post-secondary education, independent living, and the workforce; factors influencing mental, emotional and psychological health (peers, family, media, pressure to succeed); adolescents and drugs; pregnancy; prostitution; promotion of healthy sexuality as well as studies on sexually transmitted diseases; consideration of youth impact on their communities (i.e., youth engagement); nutrition and health promotion issues; and rehabilitation, and the evaluation of interventions. The role of the family in optimizing development /integration into wider society; in supporting healthy life transitions will be evaluated.

Adult disorders with possible pediatric origins, including: carbohydrate intolerance, obesity, cardiovascular disease, hypertension, cancers, and some mental disorders. Data on pregnancy, delivery, child development, genetics, and on early psychosocial, cultural, environmental and nutritional factors are required to understand these connections.

Care and Childcare The mental and emotional health and social development of children relate to their care. Areas of research include: the development and evaluation of training programs for childcare workers, youth workers and day care providers; parenting programs; child-parent relations; self-, pre- and post- school care; new models of care, including interactive approaches by family, health, social and educational systems as well as studies of the interactions which take place between and among these systems (employers/businesses etc.), in efforts to provide interactive new models of care systems; as well, support systems for parents and families are important areas to study.

Injury and abuse The underlying causes of child, abuse, and neglect; childhood injuries and accidents, and evaluation of methods for their prevention in the home, school, sports, and recreation sites are critical questions, as are the design of traffic patterns, housing, furniture and appliances for injury prevention.

Cross-cutting Activities

Many research areas of importance to Human Development and Child Health will also be cross-cutting with the interests of other Institutes. For example, partnerships could be developed with the Institute of Mental Health, Addiction and the Brain with respect to developmental neuroscience, the impact of maternal addictions on fetal development, or to research on effective parenting. There would also be an overlap of interests with an Institute of Social, Environmental and Genetic Influences on Health.

Linkages with the Nutrition, Hormones and Metabolic Health Institute could include such topics as reproductive endocrinology, juvenile diabetes, and adolescent eating disorders.

Ethical issues to be addressed would include: application of genetic and reproductive technologies; the participation of children as research subjects; issues concerning consent to treatment; and competency to make treatment decisions and the role of parents and care providers in making treatment decisions on behalf of children.

Potential Partners (examples only)

Governments: (e.g. Health Canada, provincial and territorial governments and funding agencies).
Foundations and Voluntary Sector: (e.g. children's and health charities, Children's Hospital Foundations; National Voluntary sector).
Professional Associations and Networks:(e.g. Assembly of Canadian Chairs of Departments of Pediatrics; Society of Obstetricians and Gynaecologists of Canada(SOGC); Canadian Pediatric Society(CPS); Canadian Psychological Association(CPA); Association of Professors of Obstetrics and Gynaecology of Canada; Canadian Association of Pediatric Hospitals; Canadian Academy of Child Psychiatry; Canadian Association of Health, Physical Education, Recreation and Dance (CAHPERD); Canadian Intramural Recreation Association (CIRA); Canadian Teachers Federation; Canadian Association of Principals; Canadian Association for School Health(CASH); Planned Parenthood Federation of Canada; Canadian Association of University Schools of Nursing).
Research Institutes and Centres: (e.g. Child and Youth Research Institutes across Canada; Canadian Institute of Child Health (CICH); Child and Youth Injury Prevention Centre; Canadian Fitness and Lifestyle Research Institute(CFLRD); Sex Information and Education Council of Canada; Réseau Québécois de recherche sur le dévelopment de l'enfant, Centres of Excellence for Women's Health, Centres of Excellence for Children's Well-being).

HEALTHY AGEING THROUGHOUT THE LIFE COURSE

The processes of ageing are complex, involving the interplay of social, biological, behavioural, and environmental factors. These processes occur over the lifetimes of individuals, and are influenced at both the individual and population levels by the changing environment in all its aspects: cultural, physical, socio-economic and psychological. Researchers in the Healthy Ageing Throughout the Life Course Institute will investigate the interrelated factors that influence the ageing process and health over the entire life course, and address the causes and consequences of the changing age structure of the population.

Identification of biological, psycho-social, lifestyle, environmental and other factors which contribute to longevity and to the health, well-being and resilience of individuals is increasingly important to the ongoing goals of improving the health status and quality of life of Canadians. This Institute will seek to advance our understanding of these factors and also of the causes of health status disparities which develop across the life course among sub-populations (e.g. cultural, socio-economic, gender, or geographically defined sub-populations).

A wide variety of diseases and conditions are more prevalent among the older population, for example: osteoporosis, osteoarthritis, Alzheimer's disease, cardiovascular disease, cancer, diabetes, urinary incontinence, gait disorders, sleep disturbances, and sensory impairments. This Institute will support the investigation of the origins, causes, treatments of such diseases, and the conditions and disorders that are associated with old age. It will also address how the changes that occur with age (e.g. in metabolism, immune system functioning, cell proliferation) affect the development of various diseases and conditions, and affect the response of individuals to therapies. There will be a focus on the development of age-appropriate therapies.

Older individuals are the most frequent users of many health services and therapies. Researchers will investigate patterns of health services use by different age groups within the population, explore the interactions of social and psychological factors with health service use, and address the question of how to organize and deliver health and related social services most appropriately for older Canadians. They will consider how health services should evolve so that high quality care can be sustained in the context of a demographically ageing population.

Inclusion of the Four Themes

The Healthy Ageing Throughout the Life Course Institute will support an integrated research agenda addressing all four themes of CIHR:

Basic biomedical research into ageing, including the physical and psychological changes associated with ageing.

Applied/clinical research into conditions and diseases associated with old age and age related differences in responses to treatments.

Health systems and services research into the patterns of use of, and effective constitution of, health systems and services for older Canadians; and the adaptation of health services and systems to an aging population.

Society, culture and health of populations research including societal and environmental influences on the health of older Canadians, and the ethical, legal and moral dimensions of ageing.

Research Areas

The broad streams of research which will be supported within this Institute include:

Basic molecular, cellular and genetic research on the mechanisms of ageing.

Geriatrics, including clinical research on the particular medical needs and problems of older adults; and development of geriatric assessment tools.

Neuroscience and the neuropsychology of ageing, including: age-related changes in basic cognitive processes, memory and learning; etiology, pathophysiology, and epidemiology; and clinical course, diagnosis, assessment, treatment and management of age-related neurodegenerative disorders (e.g. Alzheimer's disease).

Analysis and evaluation of health services for older adults and appropriate development of health services in face of population ageing, including: institutional acute and long-term care; community-based services; home care and rehabilitation services; the integration of health services for an ageing population; care near the end of life; family care-giving; traditional and alternative forms of care; projections of health service needs and costs; and organization and financing of care in an ageing population.

Understanding successful and productive ageing, including: health promotion in middle age and later life and the prevention of injuries and chronic diseases or conditions associated with lifestyle and behavioural factors; product safety and older adults; safety for older adults in the built environment; nutrition and fitness in later life; prevention of and response to abuse and violence against seniors; and safe medication use among seniors.

Interventions to prevent, postpone, or reverse decrements of old age such as memory loss, functional disability and withdrawal from active social roles.

Social and behavioural research on the ageing process, including the interactions of psychological and

social ageing with biological ageing processes, the effects of ageism on declines in health, and meaningful ageing.

Demography and population epidemiology in an ageing population including: determinants of health status in later life; studies of the changing older population in terms of its health, social, demographic, and functional characteristics, and the impacts of these changes on the health system; and changing age structures of urban and rural areas of Canada, and implications for the organization and delivery of health services.

Ethics of care in relation to: the application of new health technologies; life extension and the quality of life; and self-determination, competence and the role and limits of care providers in health care decision-making.

Cross-cutting Activities

Researchers in this Institute will address issues of health and ageing in light of gender differences. Differences in life expectancies between men and women are well known, and one result of women's longer life expectancy is that women, many of them widowed, predominantly populate the ranks of the elderly. Women's accumulated life experiences are markedly different than those of men, and these differences have profound effects on the health and quality of life of women and men in old age. Older women are more likely to be affected by chronic health problems and disability, and to require formal long-term care services.

Potential Partners *(examples only)*

Governments (e.g. Health Canada; provincial and territorial health ministries; regional health authorities; Status of Women Canada; Environment Canada; Statistics Canada; Human Resources Development Canada; CIHI).
Foundations (e.g. provincial medical/health research foundations; CHSRF; hospital-based research foundations).
Voluntary sector (e.g. organizations related to diseases associated with ageing; seniors organizations).
Associations and Societies (e.g. Canadian Association on Gerontology; Canadian Society of Geriatric Medicine; university-based centres on ageing).
International (e.g. International Federation on Ageing; World Health Organization; National Institute on Ageing (USA)).

CARDIOVASCULAR AND RESPIRATORY HEALTH

The research supported by the Institute of Cardiovascular and Respiratory Health will include the causes, prevention, diagnosis, treatment, and socio-economic impact of diseases of the heart, brain, lung and blood vessels.

To understand these diseases, investigations will focus on cardiovascular, cerebrovascular and other vascular functions, respiratory and critical illness at the molecular, genetic, cellular, tissue and organ levels, as well as on lifestyle factors and occupational conditions that affect this range of functions and illnesses. This knowledge is crucial for the prevention and treatment of atherosclerosis, hypertension, cardiomyopathies and genetic disorders, as well as disturbances of cardiovascular homeostasis and angiogenesis; likewise arrhythmias, congenital heart disease and infections, heart failure and transplantation. Research in cerebrovascular disease will include the role of biologically active substances and neurohormonal regulation of cells, tissues and organs in response to ischemia and hypoxia, and mechanisms underlying the initiation and progression of brain damage following a stroke.

Research in respiratory diseases will include gene therapy, factors underlying respiratory distress of the newborn, pulmonary hypertension, acute lung injury, interstitial lung disease, asthma, chronic obstructive pulmonary disease, control of breathing and sleep disorders, lung cancer and the pathogenesis of airway diseases, including the role of behavioural, psychological, environmental, social, cultural and economic factors.

Inclusion of the Four Themes

The Cardiovascular and Respiratory Health Institute will support an integrated research agenda addressing all four themes of CIHR:

Basic biomedical research into cardiovascular and respiratory health and disease, and their biological and social determinants.

Applied/clinical research to develop more effective means to prevent, ameliorate or treat respiratory diseases, heart, stroke and other cardiovascular diseases.

Health services and systems research into more effective and efficient ways to provide cardiovascular and respiratory educational, monitoring and treatment services.

Society, culture and health of populations research into effective ways to promote improved cardiovascular and respiratory health, and reduce the impact of ill-health in this area.

Research Areas

The broad streams of research which will be supported within this Institute include:

Basic science research, including discovery of the genetic variations that predispose to development of cardiovascular, cerebrovascular, lung, and blood diseases and their interaction with environmental factors to cause disease. Discoveries from basic science research form the basis for clinical investigations particularly through clinical trials.

Applied clinical research is required across all areas of investigation, including improved, less invasive methods of disease diagnosis to allow earlier identification of disease, more effective treatment and prevention strategies. Interventions include novel pharmaceuticals and technologies as well as a broader range of lifestyle change, program and policy initiatives. It will be necessary to identify the genetic basis for individual responses to drugs, to improve the outcome of organ transplantation, and improve hematopoietic stem cell transplantation.

Evaluation of health services for individuals in the acute phase of illness, as well as in the rehabilitative phase, is an integral part of the research agenda. The community is an important setting for such research, which must address ambulatory care, rehabilitation, home care support and an integrated systems approach to prevention, intervention and rehabilitation. With the ageing of the population, ambulatory care, acute and chronic care in hospitals, rehabilitation, home care and support, use of pharmaceuticals, health promotion and other interventions must undergo constant and careful evaluation. Likewise, any inequalities in access to services, whether on the basis on gender, age, socio-economic status or ethnicity require ongoing surveillance.

Determinants of health beyond individual genetic endowments, including research into lifestyle behaviours and interaction with the health care system, to more pervasive forces in the physical, social and economic environment. Work to establish more comprehensive dietary recommendations to improve cardiovascular health must be combined with effective educational strategies. Primordial prevention aims at avoiding the emergency in populations of risk of disease. Therefore, the research agenda also includes the assessment of prevention and management, not only of risk factors, but also of enabling conditions both at the individual and at the societal level. Increased knowledge and understanding of how behaviour affects the development of risk factors and to determine how to combine lifestyle changes and medical management to reduce them is required.

Population health research, including enhancing knowledge of how to extend the benefits of intervention and treatment to all population groups and how to strengthen existing health promotion and disease prevention programs. Studies of how to empower entire communities to address their social and economic conditions are needed.

Ethical issues are of concern in these research areas, such as end of life issues, genetic manipulation and transplantation, including xenotransplantation.

Cross-cutting Activities

Risks in children are a special concern. Availability of tobacco, availability and access to recreational facilities, marketing of various foods, cultural values of body image (particularly those portrayed by the media), and life stresses, are some of these factors. Of particular concern are the issues of women in terms of heart disease and stroke. Gender differences are an issue in terms of prevention, diagnosis, treatment and rehabilitation. The mechanisms that cause these diseases to develop differently in women and men need to be better understood.

Potential Partners *(examples only)*

Governments : (e.g. government departments, provincial and territorial governments, Laboratory Centre for Disease Control, Statistics Canada, Canadian Heart Health Initiative Foundation; NSERC, SSHRC, NCE-Canadian Stroke Network).
Voluntary Sector: (e.g. Heart and Stroke Foundation of Canada, Canadian Cancer Society, National Cancer Institute of Canada, Canadian Cystic Fibrosis Foundation, Asthma Society of Canada, Canadian Diabetes Association, Juvenile Diabetes Foundation, Kidney Foundation and Canadian Lung Association).
Associations and Societies: (e.g. Canadian Stroke Society, Canadian Society of Cardiovascular and Thoracic Surgeons, Canadian Association for Nutritional Sciences, National Institute of Nutrition, Dieticians of Canada, Canadian Association of Exercise Physiology, Canadian Cardiovascular Society, Canadian Council of Cardiovascular Nurses, Canadian Society of Atherosclerosis, Thrombosis and Vascular Biology).
Industry and Private Sector: (e.g. all pharmaceutical and biotechnology companies dealing with cardiovascular and respiratory health products).
International: (e.g. World Health Organization and World Heart Federation).

INFECTION AND IMMUNITY

The goal of the Institute of Infection and Immunity is to address growing health and public policy concerns for the control of infectious and immune-mediated diseases. Therapeutic research will seek to treat infection, manipulate the immune response, and use drugs and biologics to prevent and treat a wide range of such diseases. Investigators hope to harness and direct the body's immune responses to protect against and mitigate a wide range of health challenges. The interdisciplinary linkage of population biology and molecular methods will increase the understanding of disease etiology, pathogenesis, treatment, and control.

The research tools to promote, maintain and restore health include: education, surveillance, and epidemiology and treatment; along with the development and evaluation of diagnostics, antimicrobial/antiviral agents, immune modulators and vaccines. The invention and application of these tools need constant monitoring, evaluation and improvement to keep up with the pace of unexpected emerging and re-emerging challenges such as AIDS and other sexually-transmitted infections (including their interaction in transmission and control), antibacterial and antiviral drug resistance, viral hepatitis, transmissible spongiform encephalopathies ("mad cow disease"), and tuberculosis (especially in drug resistance and in HIV co-infection). Studies on potential and known zoonoses (diseases of animals communicable to humans), will depend in large part on the participation of veterinary researchers.

There is a need to better understand how these diseases differ in transmission and impact across populations, in different sexes, ethnic, cultural or age groups. Furthermore, risk management strategies are key to preventing the transmission of infectious disease. A greater understanding of individual and collective human behaviour, structures and organizations, in order to develop effective health promotion and management strategies, is required. The balancing of individual and societal rights required to manage these health risks creates many ethical dilemmas that are challenging current views in areas such as privacy of personal health data.

The immune system is the major defence against allergies and asthma, and autoimmune diseases such as diabetes, multiple sclerosis, arthritis, and lupus, which cause much human suffering and place a major burden on our health care system. Redirecting the immune response may offer the potential to overcome all of these major problems, but requires understanding the different mechanisms and factors which lead to immune health in different populations, at various stages of life and under many different circumstances. Psychoneuroimmunology is a growing area of research, investigating the links between mental health and immune response.

Transplantation of organs, tissues and cells means improved quality of life to many, yet there are still questions about organ rejection, transplant safety, appropriateness of health care, health economics and medical ethics. At the same time, researchers are harnessing immune mechanisms to destroy cancer cells within our own bodies. Other researchers are discovering that many common chronic diseases may have infectious origins, including such diverse conditions as heart disease, peptic ulcers and liver and

stomach cancer, raising the potential for entirely new health promotion and health care tactics. It is increasingly clear that immunity is an important part of health maintenance, that there are many social and individual influences on it, and that it has far-reaching benefits for individuals, populations and costs to the health care system.

Inclusion of the Four Themes

The Institute of Infection and Immunity will support an integrated research agenda addressing all four themes of CIHR:

Basic biomedical research in this Institute will range from investigating human immune function and dysfunction to basic studies of disease mechanisms and causes (bacteria, viruses, funguses, etc).

Applied/clinical patient-oriented research, including prevention, diagnosis, and treatment of infectious disease and immunological dysfunction.

Health systems and services Infectious diseases and immunology make a range of unique demands upon health care and promotion services requiring, for example, unique surveillance and transmission/ prevention strategies (e.g. infectious disease, allergy), and extensive "maintenance" and chronic care/ rehabilitation strategies to help people live with some challenges (e.g. asthma, transplantation).

Society, culture and health of populations research including strategies to prevent and control infectious and immunological challenges to health.

Research Areas

The broad streams of research which will be supported within this Institute include:

Infectious agents and communicable disease including: identification/function/activity of the agent, disease etiology and modes of transmission; functional and mechanistic studies in molecular medicine and population biology; local, national and international surveillance; prevention, diagnosis, treatment and rehabilitation strategies; and strategies for managing antibiotic, antiviral and antifungal resistance, risk management in individuals, communities, and populations, as well as in health, food, environment and blood systems

Infectious agents and chronic disease (e.g. cardiovascular, ulcers, cancer), including studying the mechanism of disease induction, and the impact of antimicrobial and immune strategies directed against the causative agents.

Food and water safety including research into: infectious agents spread through food and water; basic studies of the agents; methods for protecting our food and water supply; risk management and surveillance; and immune regulation and responses in allergies, asthma, and inflammation and autoimmunity.

Autoimmune diseases, including the mechanisms of induction and strategies for management.

Transplantation, including biological, medical, ethical, social and legal aspects.

Immunotherapies, including vaccines against cancer, AIDS, bacterial, fungal and viral diseases and gene therapy; novel interventions through modulation of immune responses.

Population health strategies While prevention of ill-health is far more attainable than in most health areas, it is highly dependant on influencing complex individual, cultural and community behaviours. This Institute will thus have a particularly strong need for major focus on population health strategies to prevent and control infectious and immunological challenges to health.

Ethics related to issues in: international health, migration, third world populations, the effects of prejudice and of education, population migrations with different disease patterns and ethics of exclusion; and AIDS and ethics. Ethical issues will be prominent in this Institute. For example, efforts to provide societal protection against individual behaviour raise issues of confidentiality, allocation of resources (access to expensive and/or unproven treatments), and providing resources to marginalized or consistently non-compliant communities) and personal risk vs. social benefit (vaccination).

Cross-cutting Activities

This Institute will engage in research in ethics, women's health, and inequalities in health. Exposure and reaction to potential infectious agents and immunological challenges and stresses vary across populations, communities, cultures and sexes; community groups and other local and representative groups thus have an important role to play. Disadvantaged groups such as recent immigrants and Aboriginal peoples are particularly vulnerable to diseases such as tuberculosis, while asthma is a rapidly growing problem among children. Sexually transmitted diseases spread very differently across men and women, while common differences in female and male lifestyles change the likelihood of exposure to certain diseases and immunological stresses.

Hormones play a significant role in mitigating response to immunological challenges, and the immunological impacts of pregnancy are significant, as is the potential for maternal-to-fetal transmission of infectious agents.

12.4 Potential Partners (examples only)

Government organizations: (e.g. Health Canada, provincial and territorial governments and funding agencies, Laboratory Centre for disease Control, Canadian International Development Agency, International Development Research Agency, Canadian Institute for Health Information, National Research Council, regional health authorities and community health agencies).
Foundations and Voluntary Sector (e.g. Canadian AIDS Society; Canadian Cystic Fibrosis Foundation; Canadian Infectious Diseases Society).
Professional Associations & Networks: (e.g. Canadian Association of Clinical Microbiology and Infectious Diseases; Canadian Association for HIV Research; Canadian Bacterial Diseases Network; Canadian Dermatology Association; Canadian Foundation for AIDS Research; Canadian HIV Trials Network: Canadian Society of Allergy and Clinical Immunology; Canadian Society for Epidemiology and Biostatistics; Canadian Society for Immunology; Canadian Society for Microbiologists; Canadian Society of Transplantation).
International: (e.g. International Society for Infectious Disease; The National Institute of Allergy and Infectious Diseases, (USA); World Health Organization).

MUSCULOSKELETAL HEALTH AND FITNESS

The mandate of the Institute for Musculoskeletal Health and Fitness is to promote healthy lives for Canadians by supporting research into mobility, movement and active living, and through research to reduce the burden of illness associated with diseases of the bones, muscles, joints, teeth, and skin.

Arthritis, osteoporosis, hip and spine fractures, back pain, upper limb musculoskeletal disorders and periodontal disease, are among the most important causes of disability and lost productivity for Canadians, and are a significant social and economic burden for the country.

In connection with the promotion of a healthy lifestyle, this Institute will fund research in the areas of skin and dental health, active living, kinesiology, physical exercise, and sports- medicine/rehabilitation. Injury and disease prevention, fitness, occupational therapy, physiotherapy, and rehabilitation will be important components of this Institute.

Inclusion of the Four Themes

The Institute for Musculoskeletal Health and Fitness will support an integrated research agenda addressing all four themes of CIHR:

Basic biomedical research to increase knowledge of the structure and functioning of connective tissues, tendons, ligaments, joints, bone, muscle, teeth and skin; and to increase understanding of causes and manifestations of ill health in these areas, and enhance the progress made in the prevention and treatment of these conditions.

Applied/clinical research on such important clinical issues as the development of methodology to measure outcomes in arthritis, the advancement of surgical techniques in orthopedic surgery, the treatment of conditions such as osteoporosis, and the clinical trials of therapeutics to assist those Canadians living with these conditions.

Health services and systems research including: the promotion of healthy living in at-risk populations (including injury prevention); the enhancement of community living and care; the reduction of access barriers; the development of assistive devices; and the social and economic impacts of living with chronic pain upon individuals and families.

Society, culture and health of populations research including strategies to reduce the incidence and impact of musculoskeletal and related conditions among the working population.

Research Areas

The broad streams of research which will be supported within this Institute include:

Arthritis, including: inflammation; immunology; rheumatic diseases; assistive devices; therapeutics; pain and chronic pain management; coping and care in the community; reduction of access barriers (improvement of daily living); cartilage and joint biology, animal models; genetics; tissue engineering; and biomechanics and joint movement.

Bone and muscle, including: osteoporosis, bone and mineral research; cartilage, joint, connective tissue, cell biology, and developmental biology; genetics, muscles, tendons, ligaments, and muscular dystrophies; skull and facial anomalies; biomedical engineering, tissue engineering, orthopedic research/orthopedic surgery; and chiropractic, gender impacts, diet, and biomechanics.

Skin, including dermatology, psoriasis, burns, tissue engineering,

Oral/dental health studies of structure and function in health and disease of tissues in the oral cavity, periodontal disease, orthodontics, infection and immunity, prostheses, biomaterials, orofacial neurophysiology, dental services, dental health.

Fitness and mobility, including: movement disorders; injury prevention; assistive devices; prosthetics; occupational health; disabilities; psycho-social impacts of disability; active living; kinesiology and sports medicine; rehabilitation and physiotherapy; occupational ergonomics; exercise and exercise physiology; and psychology.

Active living and promotion of healthy life years studies on current status and trends in participation levels and forms of physical activity for the population (including specific at risk sub-groups) and the relationships to health status; knowledge/attitudes/behaviours related to physical activity; determinants of physical activity/inactivity with specific reference to common barriers; effectiveness of interventions to increase physical activity levels for the population as a whole and for specific population segments; and social and economic impact of physical inactivity.

Care and care giving, including formal and informal sources of support; burdens of care; chronic pain management; socio-economic impacts of lost healthy life years (or impact of added "life to years"); waiting lists; human resource requirements for medical care and community care; costs of interventions (hip replacements); and health economics.

Ethical issues related to the Institute's mandate such as care patterns and the treatment of the elderly, ethics and occupational health and safety.

Cross-cutting Activities

A key component of this Institute will be gender analysis, given that the burden of these illnesses falls disproportionately upon women. Issues concerning osteoporosis, arthritis, care in the community, and active living will all have particular focus upon women's health.

Strong linkages will develop with the Institute of Health Throughout the Life Cycle in connection with musculoskeletal disorders of ageing, with social, environmental and genetic influences on Health Institute for all occupational issues, with the Cardiovascular and Respiratory Health Institute in studies of exercise and fitness, and with the Immunity and Infection Institute in order to co-ordinate research in the field of arthritis.

Potential Partners *(examples only)*

Government: (e.g. Health Canada, provincial and territorial governments and funding agencies, Participaction).
Voluntary Sector: (e.g. Arthritis Society, Muscular Dystrophy Association, Seniors groups).
Professional Associations and Networks: (e.g. Canadian Dental Association, Community Occupational Therapists Association, Physiotherapists Association, Canadian Rheumatology Association, Arthritis Health Professions Association, Orthopaedic Associations, Canadian Women's Health Network, British Columbia Centre of Excellence for Women's Health).
Complementary Research Initiatives: (e.g. Arthritis Network NCE, Cochrane Musculoskeletal Group).
Research Centres: (e.g. Canadian Fitness and Lifestyle Research Institute, IRSST (Montreal)).

NUTRITION, HORMONES AND METABOLIC HEALTH

Researchers in the Nutrition, Hormones and Metabolic Health Institute will investigate the links between diet, digestive functions, metabolism, excretion and good health.

It has long been said that "You are what you eat". Researchers are increasingly discovering that this is true. They are also finding out, however, that the question of what you eat, why you eat it, and how your body uses, stores, and discards food and drink, is an enormously complex interplay of behavioural, cultural, genetic, biochemical and physiological factors.

The quality of our diet reflects the food available to us in our current geographical, social, and economic situation as well as personal choice (ranging across raw, process and fortified food, to cafeteria, restaurant and fast food) and our collective food choices in turn have broader implications for our society, environment and economy. Food availability and choices vary by populations, regions, sex, age, ethnicity and other factors, and involve ethically complex government, corporate and personal decisions about balancing individual and societal risks and benefits.

The body's ability to make best use of the nutrition provided depends on optimizing biological systems from the genetic to the physiological to the psychological. Researchers in this institute will investigate the mechanisms by which all of these factors play their part, and how they interact with and affect each other. Researchers will investigate human nutrition needs and the most effective ways to achieve optimum nutrition for various segments of society. They will also investigate problems such as diabetes, eating disorders, and gastrointestinal, liver or kidney dysfunction, to better understand their causes and impacts, and seek means to improve metabolic health through prevention, treatment and mitigation of impact of these problems. Acute and chronic disease may have profound effects on intermediary metabolism and hence may alter nutrient requirements. Understanding of these complicated interrelationships will provide the knowledge needed to establish optimum health requirements and support efforts in health promotion.

Inclusion of the Four Themes

The Nutrition, Hormones and Metabolic Health Institute will support an integrated research agenda addressing all four themes of CIHR:

Basic biomedical research will include investigation of the nature and mechanisms of metabolism, hormones and nutrition, steroid metabolism, intracellular signal transduction, regulation of energy balance and body composition and the links and interactions between the food chain and human health. Fundamental studies into the regulation and coordination of all aspects of the endocrine system will be an important component of the Institute's activities.

Applied/clinical research will consider questions such as how to prevent and treat diabetes and metabolic dysfunctions, or to address nutritional imbalances, seeking ways to improve kidney, liver, and digestive health.

Health services and systems research will consider questions as varied as the best means to provide dietary information/support and exercise activities to obese adults at high risk of adult-onset diabetes, to the most effective delivery mechanisms for providing insulin at a steady rate to children with juvenile diabetes.

Society, culture and health of populations research will, for example, build on our knowledge of optimal nutrition and diet-disease interactions to help reduce the incidence of devastating diseases such as cancer and diabetes, and improve the overall health and well-being of the population.

Research Areas

The broad streams of research which will be supported within this Institute include:

Diabetes, kidney, liver and pancreas health and dysfunction, including juvenile and adult onset diabetes, cirrhosis, etc. (prevention, control, treatment, transplantation); medical, social, economic causes and impacts, including causes such as obesity, hepatitis C and others; and co-morbidities (kidney, vision, etc.).

Nutrition and diet, including: optimal nutrition, obesity, malnutrition and eating disorders; gastrointestinal health and disease; medical, social and economic contributors and impacts; co-morbidities, including diabetes, heart health, osteoporosis; health promotion and education; diagnosis; and treatment and control.

Nutrition and human development, including population and life-cycle specific nutrient use and requirements (e.g. populations such as Aboriginal peoples or inner-city children, or life stages such as geriatric and during pregnancy, lactation and infant feeding or parenteral/enteral nutrition).

Nutrition in care and healing, including pathogenesis of nutrient imbalance caused by disease; nutritional support, and enteral tube feeding and parenteral (intravenous) feedings.

Hormones and the endocrine system, including their role in the control of appetite; absorption of nutrients and digestion; maintaining and regulating energy; balance and growth; responding to stress and social/environmental influences; and the influence on cause/prevention of obesity, diabetes, bone disorders, cancer, etc.

Food and health, including: choices and availability; production and safety; "functional foods" and phytochemicals; and the role of food production techniques in food-related disease.

Natural health products, including functional foods and nutriceuticals.

Digestion and gastrointestinal health, including: IBD, Crohn's disease and colitis; all forms of hepatitis; and alcoholic liver disease and liver transplantation.

Genito-urinary systems, and renal health, including: prostate disorders, such as BPH and prostatitis; progressive kidney failure; and end-stage renal disease.

Health risks and diet, including: managing health risks through diet; diet/disease interactions; dietary treatments (e.g. nutrition as a promoter of cancer, atherosclerosis); and food-related illnesses.

Cross-cutting Activities

This institute will engage in research in key cross-cutting theme areas of CIHR, including ethics, women's health, and inequalities in health. Few health issues exemplify the inequalities in health as vividly as nutrition, nor the ethical challenges in attempting to promote optimal nutrition. The ability and desire to achieve optimal nutrition is highly variable across populations and communities, and resulting health impacts fall unevenly across sex, age, regional, economic and cultural groups. This institute will have strong linkages with many others, for example, with the Health Throughout the Life Cycle Institute in the area of reproductive endocrinology, with the Institute of Immunity and Infection in studying food-related illness, and with the Aboriginal Institute in the study of factors predisposing Indigenous peoples to diabetes.

Potential Partners *(examples only)*

Government:(e.g. federal and provincial ministries of health and agriculture; federal research councils: NSERC, SSHRC, NRC).
Voluntary Sector, Foundations and Societies: (e.g. Canadian Celiac Association; Canadian Cystic Fibrosis Foundation; Canadian Diabetes Association; Canadian Digestive Disease Foundation; Canadian Foundation for Dietetic Research; Canadian Liver Foundation; Crohns and Colitis Foundation of Canada; Diabetes Council of Canada; Dieticians of Canada Juvenile Diabetes Foundation Canada & International; Kidney Foundation of Canada; National Aboriginal Diabetes Association; National Cancer Institute of Canada; Nutrition Today Society; Obesity Canada; Osteoporosis Society of Canada).
Research Associations and Networks: (e.g. Canadian Association for Dental Research; Canadian Association of Gastroenterology; Canadian Association for Nutritional Sciences; Canadian Association

for the Study of the Liver; Canadian Foundation for Dietetic Research; Canadian Institute of Food Science and Technology; Canadian Society of Endocrinology and Metabolism; Canadian Society of Exercise Physiology; Food and Health Outcomes; Canadian Institute of Nutrition; Canadian Society for Nutritional Sciences; Confederation of Canadian Faculties of Agriculture and Veterinary Medicine; Endocrine Society; North American Society for the Study of Obesity, Canadian Women's Health Network).

Industry and Private sector: (e.g. food and pharmaceutical industries; Grocery Manufacturers' Association of Canada).